

# Harvard Medicine

AUTUMN 2012

## wounded, deeply

Doctors probe  
new ways to  
mend tattered  
bodies, minds,  
and societies



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**HAIR OF THE DOG:** The poodle Cosmo, a member of Delta Society's Pet Partners program and a volunteer with the animal-visitation program at Beth Israel Deaconess Hospital, brings calm and comfort to patients and staff alike.



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# From the Dean

THOUGHTS ON INNOVATION



TENDING TO THE TRAUMAS inflicted upon fragile humans was likely among the earliest tasks confronting healers in ancient times. Attending to wounds remains a fundamental task for physicians: There's never a shortage of accidents and injuries—nor, it seems, of wars.

In this issue of *Harvard Medicine*, we describe some of the advances that HMS physicians and researchers are making to treat wounds. Whether the trauma springs from flame, explosion, or other insult, those who have been physically injured can rely, as they have through the ages, on the caring touch of a physician who deftly wields the latest tools to initiate, speed, or complete the healing process.

We also look at approaches that HMS alumni and

clinicians are taking to soothe the spirit and mend the mind. One example takes us to La Paz, Bolivia, where the commitment of an alumnus to provide medical care to street children in this South American city has blossomed into an organization that helps children gain the educational, employment, and social skills they need to play a larger role in society. Another looks at the power that make-believe and play can have when in the hands of hospital staff who seek to protect their young patients from the traumas of illness, injury, and hospitalization. And finally, we enjoy a look at pooches that visit patients, dispensing calm and companionship that can be measured in smiles.

On a different note, we bring you what may qualify as some “back-to-School” stories. We mark with pleasure the continuing presence of the Longwood Symphony Orchestra, a group populated largely by HMS physicians and students, by saluting the twentieth anniversary of its Healing Art of Music program, a philanthropic effort that continues to support the work of many health care-based nonprofits. And we delight in bringing you news of a tiny garden—planted in the shadow of the Countway Library—that is poised to become a novel tool for students, faculty, and anyone interested in learning about natural medicines.

Autumn represents a return of opportunities to settle in with a good read. Like this issue, we hope.

**Jeffrey S. Flier**  
Dean of the Faculty of Medicine  
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# Letters to the Editor

CHART NOTES FROM OUR READERS



## Moon Man

The Lovelace name endures in New Mexico in a descendant of the Lovelace Clinic, the Lovelace Health System, and in Lovelace's true legacy, the Lovelace Respiratory Research Institute.

DERICK P. PASTERNAK '67  
SEATTLE, WASHINGTON

## Ties that Bind

I read with great interest the article about William Randolph Lovelace II '34 that Anthony Patton '58 wrote for the Spring issue of *Harvard Medicine*. As a 21-year veteran of the Lovelace Clinic, which Lovelace turned into a premier health care institution in the Southwest, I was steeped in the history of Dr. Lovelace. In the late 1980s, during my six-year tenure as CEO of the Lovelace Medical Center and its successors, we built our education building to include a little museum of memorabilia from Dr. Lovelace's aviator days. The museum was still there on my last trip to Albuquerque. I had the pleasure of working at the medical center with Patton's HMS classmate, Christian von Hoyningen-Huene '58 and my classmate Bill Christensen '67.

The Lovelace name endures in New Mexico in a descendant of the Lovelace Clinic, the Lovelace Health System; in Lovelace's true legacy, the Lovelace Respiratory Research Institute; and in related organizations.

DERICK P. PASTERNAK '67  
SEATTLE, WASHINGTON

## Under Pressure

The Spring issue of *Harvard Medicine* was especially interesting to me. My late husband, James Edwin Wood '49, conducted research in the early 1950s while at Randolph Air Force Base in San Antonio, Texas. Like William Randolph Lovelace II, my husband was fascinated by the physiological effects that high-altitude flying had on airmen. And like Lovelace, he was an inventor who took personal risks to test equipment he believed could save lives. His invention was an open-circuit pneumatic vest that, when worn with a partial pressure suit, could protect pilots from decompression at high altitudes. To prove the vest worked, he tested it himself in a chamber that simulated the atmospheric pressure at 50,000 feet. My husband's work earned him a commendation medal, presented to him by a man he admired, General Curtis LeMay.

ANN J. WOOD  
BRYN MAWR, PENNSYLVANIA

## Crowd Source

The look into the rich history of HMS in the Spring issue of *Harvard Medicine* ("Man in the Moon") led me to wonder whether there were recollections among the magazine's readers concerning two topics I'm researching. The first deals with interviews with students seeking admission to the School in the 1950s and 1960s. There are stories, many attributed to the actions of Daniel Funkenstein, that these interviews were crafted to observe candidates' responses to stress. Would any readers have information or personal stories of such interviews? Any such practices have long since been repudiated at HMS, but gaining facts on past practices could help us in our efforts to lessen the tension of the interview day and counter our reputation for stressing interviewees.

I also would welcome any information readers may have on the "How to Be an Intern" lectures that Judah Folkman '57 gave to HMS students in the late 1960s and early 1970s. Perhaps a reader could share her or his notes from these lectures. We are interested in tapping the wisdom of Folkman's presentation as we prepare to launch a capstone course for medical students who are starting their residencies.

If any readers would like to share information on either of these topics, please send a note to me at [harvardmedicine@hms.harvard.edu](mailto:harvardmedicine@hms.harvard.edu). Thank you.

JULES DIENSTAG  
HMS DEAN FOR MEDICAL EDUCATION  
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Harvard Medicine welcomes letters to the editor. Please send letters by mail (Harvard Medicine, 107 Avenue Louis Pasteur, Suite 111, Boston, MA 02115); fax (617-432-0446); or email ([harvardmedicine@hms.harvard.edu](mailto:harvardmedicine@hms.harvard.edu)). Letters may be edited for length or clarity.





**SUCCESS:** Members of the Class of 2012 gather with Nancy Oriol, dean of students (center, red robe), and Jeffrey S. Flier (blue robe), dean of the faculty of medicine, to commemorate their graduation day.

## Giving Voice

Class Day speakers highlight the virtue of humility

**d**URING CLASS DAY this spring, heavy rains gave way to sunshine as the School's new graduates were congratulated, then reminded of their privileged place in society and the responsibility that privilege brings. With humor and passion, speakers told of how the experience of learning to care for patients was a humbling one that would not end with commencement. Instead, physicians must embrace humility so that they continue to learn from their patients, to listen to their patients, and to speak and act on their patients' behalf.

Jeffrey Daniel Hurwitz Wessler '12 carried this theme through

his remarks. Wessler, noting that medical school taught the student-physicians to "not take ourselves too seriously," expanded on the usefulness of humility by acknowledging that "each humbling loss of dignity comes coupled with a valuable piece of wisdom." He went on to thank his patients for those bits of wisdom, none of which, he said, were found in any of his textbooks.

"How can we best pay homage to the beauty of those patients who have touched our lives?" asked Imani Rafiki Anwisyse '12 of herself and her classmates. Anwisyse spoke of "the honor of sharing the most intimate details of a fellow human's trials, triumphs, and

fears." Anwisyse also spoke of the glimpses into the human condition that the graduates had witnessed, from the hope and joy of a new life to the "crushed, silenced, and broken" spirit of a patient "battered by circumstances of the world."

Commencement speaker Donald Berwick '72, an HMS lecturer on health care policy, kept the focus on humility by noting that, over the years, there would be patients who would stand out as teachers, those who "if you allow it—and you should allow it—will enter your soul, and you will, in a way entirely right and proper, love them." For Berwick, one of those patients was Isaiah, a child of an unforgiving inner city whom Berwick treated for leukemia. Although the treatment eventually cured Isaiah of the disease, Berwick said that uncontrolled diabetes, and "even more, uncontrolled despair," conspired to end Isaiah's life at age 39.

Isaiah's story illustrated the two duties of the physician, Berwick said: to cure disease and to cure the injustice that contributes to disease. Patients, said Berwick, "need those in power—you—to say to others in power that a nation that fails to attend to the needs of those less fortunate among us risks its soul."

—Susan Karcz



VIDEO EXTRA

Donald Berwick addresses graduates  
[hms.harvard.edu/content/2012-class-day-speaker-donald-berwick-md-mpp](http://hms.harvard.edu/content/2012-class-day-speaker-donald-berwick-md-mpp)





## Sweet Sixteen

ON AUGUST 21, the 165 members of the Class of 2016 gathered for the White Coat ceremony, a treasured tradition at HMS. The incoming first-year students include graduates of 71 colleges and universities from 29 U.S. states and the District of Columbia, and nine other countries—Canada, China, Ghana, Indonesia, Jamaica, New Zealand, Nigeria, Peru, and Zimbabwe. Women make up 53 percent of this class; 29 percent are of Asian heritage; and 21 percent are from groups underrepresented in medicine: African American, Cuban, Hispanic, Mexican American, Native American, Native Hawaiian, and Puerto Rican.

## ALL EYES ON THE ALPERT PRIZE

HMS research team's drug discovery redefined multiple myeloma treatment

THE 2012 WARREN ALPERT FOUNDATION Prize was awarded on September 24 to four scientists instrumental in developing the drug bortezomib, which has radically altered the therapeutic landscape for hundreds of thousands of individuals with multiple myeloma, a deadly blood cancer.

This year's recipients were Julian Adams, president of research and development at Infinity Pharmaceuticals; Kenneth Anderson, the Kraft Family Professor of Medicine at Dana-Farber Cancer Institute; Alfred Goldberg, an HMS professor of cell biology; and Paul Richardson, the R.J. Corman Associate Professor of Medicine at Dana-Farber. The awards were conferred by Bevin Kaplan, director of the Foundation.

The story of bortezomib, now marketed as Velcade, embodies the Alpert Foundation's vision for honoring transformative science. The prize, now in its twenty-fifth year, recognizes researchers whose laboratory discoveries offer dramatic promise for improving human health.

"Adams, Anderson, Goldberg, and Richardson's discovery and development of bortezomib as a treatment for multiple myeloma beautifully fulfills the mission of the prize of rewarding bench-to-bedside translational research," says Jeffrey S. Flier, dean of the faculty of medicine at HMS.

In 1993, Goldberg teamed up with three Harvard faculty investigators to establish a company with the primary goal of developing a compound that would inhibit the biochemical activity of the proteasome. Interest in the proteasome, a cellular structure that collects damaged or unused proteins generated during the protein breakdown process, stemmed from the fact that its actions contribute to the loss of muscle mass. Many of the forerunners

of bortezomib that were synthesized in the company's laboratories have since been used by thousands of investigators to uncover the proteasome's critical role in regulating many key processes.

In 2003, bortezomib was approved by the U.S. Food and Drug Administration. "Bortezomib is a wonderful example of how basic biological information gleaned from the laboratory can have unforeseen applications years later," says Goldberg. "I speak for all four of us when I say how wonderful it is to be recognized by the Alpert Foundation."

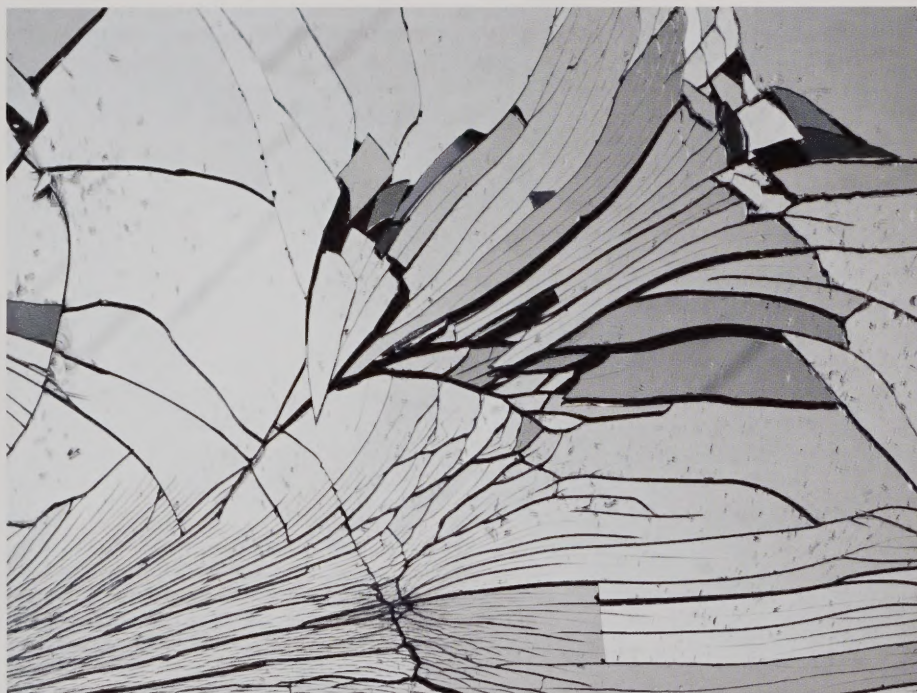
—David Cameron





# BENCHMARKS

DISCOVERY AT HARVARD MEDICAL SCHOOL



## ALL THE RAGE

Severe outbursts of anger affect up to six million U.S. adolescents

MOST ADULTS EXPECT THAT YOUNG PEOPLE, as part of growing up, will rail against the system, any system. But research from the Department of Health Care Policy at HMS finds that the extent and degree of anger among adolescents is far greater, and far more destructive, than many have realized.

Approximately six million U.S. adolescents have experienced an anger outburst that involved threatening violence, destroying property, or engaging in violence toward others, according to a report in the July 2 issue of *Archives of General Psychiatry* by a research team led by Ronald Kessler, the McNeil Family Professor of Health Care Policy at HMS. These severe attacks of uncontrollable anger meet the criteria for a diagnosis of what is known as intermittent explosive disorder, a syndrome characterized by persistent uncontrollable anger attacks not accounted for by other mental disorders. The disorder is associated with behavioral problems that manifest later in life, including depression and substance abuse.

The study, based on the National Comorbidity Survey Replication Adolescent Supplement, a face-to-face survey of more than 10,000 U.S. adolescents, indicates that intermittent explosive disorder is a severe, chronic, commonly occurring disorder that begins in late childhood. Yet the study also shows that youths with this disorder are undertreated. Although 37.8 percent of adolescents with intermittent explosive disorder obtained treatment for emotional problems in the 12 months prior to the study interview, only 6.5 percent received treatment specifically for anger. The researchers argue for the importance of identifying and treating the disorder early, perhaps through school-based violence-prevention programs.

## Tic Tack

Behavioral therapy proves effective for Tourette's tics in adults

ADULTS WITH TOURETTE SYNDROME may be able to use behavioral therapy to control the sometimes debilitating physical and verbal tics that characterize the condition. A team of investigators at Massachusetts General Hospital reports that a combination of tic awareness and competing-response training, what the team calls comprehensive behavioral intervention for tics, allowed patients to gain greater control over their tic expression when compared with an approach that uses traditional psychoeducation and supportive therapy.

The research team, headed by Sabine Wilhelm, director of the OCD and Related Disorders Program at Mass General, conducted a multisite, randomized, case-controlled trial of 122 adult participants in which participants were taught to recognize early signs of a tic urge, and to respond to the urge with a voluntary movement instead. The data, gathered at Mass General, Yale University, and the University of Texas Health Science Center at San Antonio, were published in August in *Archives of General Psychiatry*.

"The program we tested was associated with a greater decrease in tic severity than the control treatment," says Wilhelm.

At the end of the 10-week study period, 38 percent of the patients who learned comprehensive behavioral intervention for tics showed significant improvement when compared with those who received psychoeducation and supportive therapy. At a six-month follow-up, study participants reported that the beneficial effects of the behavioral therapy approach persisted.

Tourette syndrome affects an estimated 6 in 1,000 children in the United States. While children's symptoms frequently decrease as they grow older, the verbal and physical tics can persist into adulthood. Clinicians have long relied on powerful antipsychotic medications as treatment. However, the unpleasant side effects of these medications cause patients to discontinue them, resulting in a return of symptoms.

"This study," says Wilhelm, "shows that cognitive-behavioral approaches can be an important part of the treatment of Tourette syndrome."





## NO E-C SOLUTION

Vitamins found to have no protective effects on vision

THOSE SEEKING TO PROTECT their eyes from macular degeneration should not rely on antioxidant supplements, especially vitamins E and C, according to a paper in the August issue of *Ophthalmology*, reported by HMS researchers. For the study, a research team led by William Christen, an HMS associate professor of medicine at Brigham and Women's Hospital, followed more than 14,000 male physicians age 50 and over for eight years, during which the randomly assigned participants took supplements of vitamin E or a placebo every other day, coupled with a daily dose of either vitamin C or a placebo, to determine whether the antioxidants

affected the rate of retinal erosion. At the study's end, the team found that, when the development of macular degeneration among placebo-taking participants was compared with that for those taking supplements, neither vitamin conferred protection against the disease.

Other research has indicated that antioxidants offer protection against macular degeneration. Yet, at eight years, this study has taken the most concerted look at long-term use of vitamin E and its effects, and is the first to consider the effects of vitamin C in preventing this disease. Macular degeneration currently affects an estimated 7.2 million people in the United States.

## In the Balance

Researchers uncover clues to late pregnancy heart failure

PERIPARTUM CARDIOMYOPATHY, a form of heart failure that develops late in pregnancy or shortly after delivery, results in a frightening turn of events that can leave new mothers suffering from a lifelong chronic heart condition that is often fatal.

Now, investigators at Beth Israel Deaconess Medical Center have discovered clues behind this dangerous condition, providing the first clear evidence that peripartum cardiomyopathy is a vascular disease, brought about by an imbalance of angiogenic proteins in the heart during the peripartum period.

Reporting in the May 17 issue of *Nature*, a team of researchers led by Zoltan Arany '98, an HMS assistant professor of medicine and an investigator in Beth Israel's CardioVascular Institute, details the underlying mechanisms for the condition and identifies preeclampsia and multiple gestations as risk factors. In addition, the investigators point out the beneficial effects that proangiogenic therapies could have for women with this vascular disease.

Peripartum cardiomyopathy affects approximately one in 1,000 women with no known history of heart disease. Symptoms can be mild to severe, and include shortness of breath caused by the heart's diminished pumping ability. About one-half of women who develop the condition will spontaneously recover, but others will grow worse, even to the point of requiring a heart transplant.

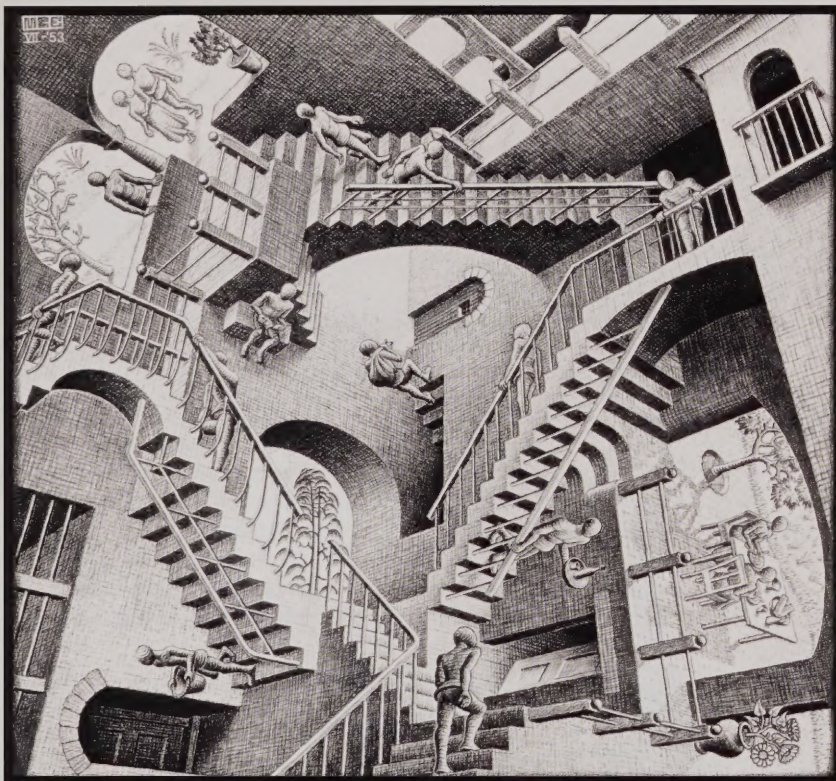
"It's been a real mystery," says Arany. "The majority of women who develop this condition are otherwise healthy, even active. We know that the real stressors of pregnancy occur in the first trimester. Why then, are these mothers-to-be developing such serious problems at the end of pregnancy?"

Through a series of studies in both animal models and humans, the researchers determined that peripartum cardiomyopathy is a two-hit disease that begins with elevated late-pregnancy signals to prevent angiogenesis, or normal blood vessel growth, and continues when something as yet undiscovered leaves women susceptible to cardiac damage—possibly an infection or genetic predisposition.

"This is really a whole new way to think about peripartum cardiomyopathy," says Arany.

—Bonnie Prescott





## UNSTEADY STATES

Delirium during hospital stays can accelerate cognitive decline

DELIRIUM EPISODES DURING HOSPITALIZATION are not isolated occurrences for patients with Alzheimer's disease, according to research by HMS investigators at the Institute for Aging Research at Hebrew SeniorLife. In fact, these acute instances of cognitive decline that affect attention and executive function, sometimes for several days, can result in sharply increased rates of mental deterioration for up to five years post-hospitalization. This long-term outcome can be especially troubling for Alzheimer's patients; when hospitalized, patients with this neurodegenerative disease often experience episodes of delirium. The study is the first to examine the significance of the prevalence of delirium over an extended period.

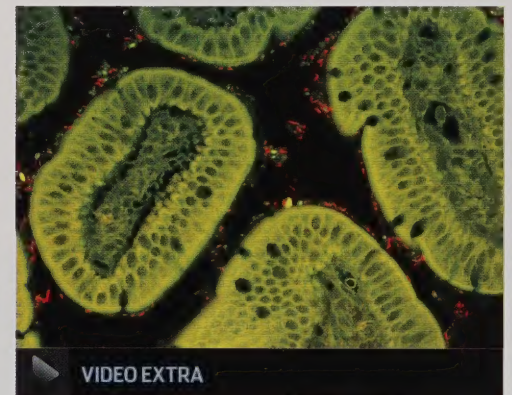
The study, published online August 20 in *Archives of Internal Medicine*, showed that patients who developed delirium during hospital stays experienced greater cognitive deterioration in the year following their hospitalization than those who had no episodes of delirium while hospitalized. In addition, mental deterioration in those experiencing delirium proceeded at twice the rate of those who were without delirium in the year after hospitalization. And for five years after their hospital stays, those who had suffered episodes of delirium maintained a more rapid rate of cognitive deterioration.

According to Alden Gross, lead author of the study and an HMS research fellow in medicine at Beth Israel Deaconess Medical Center, the annual cost of delirium to the U.S. health care system is between \$40 and \$150 billion. Although strategies to treat delirium when it occurs during hospitalization are still being studied, he adds, the study's findings indicate that it may be important to implement proven strategies to prevent it from occurring in the first place.

## Research to Watch

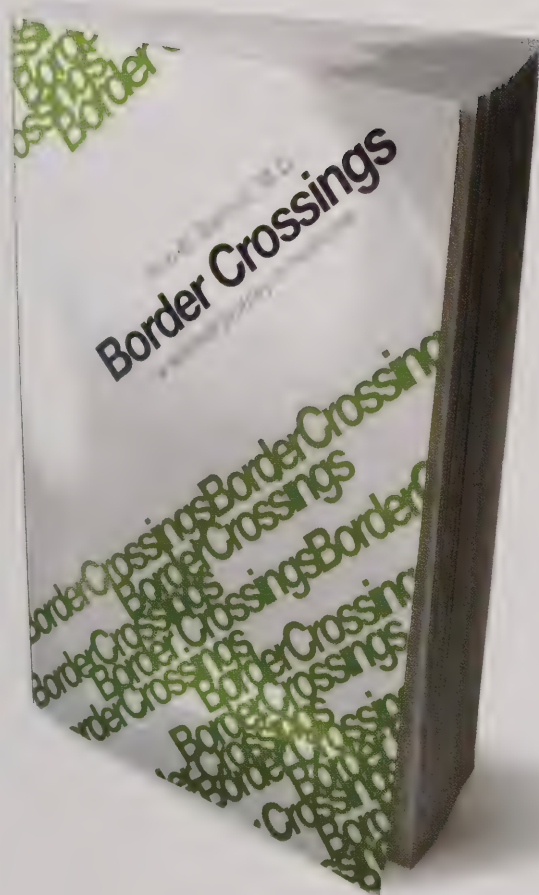
Our Microbes, Ourselves

HMS RESEARCHERS have shown that the abundant microbial life in our gastrointestinal tracts, so essential to our maintaining a healthy immune system, co-evolved with their human hosts to such an extent that they provide no immunological benefit to any other mammal. The study sheds light on the hygiene hypothesis, which states that environments kept exceedingly clean with antibacterial products might thwart the immune protection offered by microbes. The study appeared in the June 22 issue of *Cell*.



View the video at:  
[hms.harvard.edu/content/our-microbes-ourselves-0](http://hms.harvard.edu/content/our-microbes-ourselves-0)





## ROAD TRIP

*Border Crossings:  
A Spiritual Journey  
in Medicine*  
by Ann B. Barnet '55

(POTTER'S HOUSE BOOKSERVICE, 2011)

"SOME OF THE PEOPLE I love and admire the most," Ann Barnet writes in the preface to her earnest memoir, *Border Crossings: A Spiritual Journey in Medicine*, "do not at all understand or agree with the basis of my life of faith." Here is a Christian doctor who cofounded a Washington, DC, community center for families, a "ridiculous bleeding heart in this decaying old world," who realizes that in medicine, religiously driven action

is more often judged for the religion than the action. She forgives this. She would probably even forgive a review that ignored her faith.

But, no—the faith is impossible to ignore. It begins with her parents, born Jewish, who converted as teenagers to "Hebrew Christians." Her father taught Jewish life and customs (as if the topic were anthropological) to missionaries in a Bible institute in Chicago. Their religion was consuming and unpraising. "When we were good, Jesus got the credit."

Escaping these mixed family blessings, Barnet changed her name and even her handwriting in college. She read Freud with Joseph Campbell, plucked piano strings with John Cage, and almost dated J.D. Salinger. She studied inherited behavior in inbred mice, and had "plenty of time to daydream about the mouse's free will and mine." She also found her way to HMS.

This was in 1951. There were eight women in the class. None were allowed to live in Vanderbilt Hall. Education was different, too. In her psychiatry rotation, the class followed one ill-prepared volunteer through an LSD trip, an experience that led

Barnet to conclude she "did not have the nerve to be a psychiatrist. [They] were clumsily meddling with souls."

Instead, she joined an EEG lab at Boston Children's Hospital, studying evoked potentials in the brains of infants. At a dizzying pace, she married, graduated, had several infants of her own, followed her husband's career to Heidelberg and back, joined Massachusetts General Hospital as a pediatric neurology resident, followed her husband's career again (feminist, but dutiful) to Washington, DC, and settled into an electroretinography lab that measured stimulus-evoked potentials in newborns. During the rubella epidemic of 1963, physicians who used this technology to re-examine infected babies found that many who had been deemed severely retarded were instead hard of hearing.

The family moved briefly to Mexico City, where Barnet used EEGs and evoked potentials to study the effects of severe malnutrition and rehabilitation on infant brain function. Her patients, who lived among the garbage mountains outside Mexico City, weighed less on hospital

admission than they had at birth.

Somewhere in these years, an unabashed, unambivalent faith in Christianity returned. Back in DC, in her lab at Children's National Medical Center, the discontinuity between religious and professional life became untenable. She felt frankly "called" (which, as she acknowledges, can be frankly uncomfortable for the nonbeliever to read about). In 1979, with other church members, she cofounded The Family Place, the first family-support center in DC for low-income refugees of all legal statuses. Today, mothers bring their newborns there straight from the maternity wards. Infants find food, diapers, and comfort. Parents find English lessons, legal advice, medical referrals, parenting classes, and "wall to wall encouragement." Everyone finds what they need.

Barnet also found what she needed. In the end, she "planted both feet across the border," leaving the academic world for The Family Place. Knowing her through her memoir, she would wish all of us such a crossing.

*Elissa Ely '88 is a psychiatrist at the Massachusetts Mental Health Center.*



# SECOND OPINIONS

EXAMINING THE AFFORDABLE CARE ACT



Thomas Daschle



William Frist

**“Will the implementation of the Affordable Care Act solve the health care crisis this country faces?”**

**Perspectives from  
Thomas Daschle and William Frist**

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#### **Thomas Daschle:**

If one defines a health system as an entity with a central decision-making and administrative authority, the United States has never had one. Instead, we have had a health marketplace made up of a collage of public and private subsystems. This has been a strength—and a weakness. The challenge has long been to determine the proper role of government in bringing greater access, efficiency, and value to health care while continuing to encourage innovation.

Enacting the Affordable Care Act to meet that challenge

is the most transformational health policy achievement in our nation's history. The unprecedented scope of the law has been remarkably catalytic in bringing meaningful change to both the private and public health sectors, exceeding in importance even the creation of Medicare and Medicaid. Already the law is responsible for building a new health infrastructure that aims to support a high-performance, high-value national health care system delivering greater access, better quality, and lower costs.

That said, the Affordable Care Act cannot, nor is it intended to,



**The Affordable Care Act cannot, nor is it intended to, solve the entire health care crisis in America. As with any major legislative effort, the law remains a work in progress.**

solve the entire health care crisis in America. As with any major legislative effort, the law remains a work in progress.

In its first two years, the most tangible benefits of the law can be found in the insurance industry. Two and a half million young adults now have health insurance through their parents' plans. And more than five million seniors and people with disabilities have saved billions of dollars on prescription drugs, while millions more have taken advantage of preventive health care services.

Insurance companies are now required to spend at least \$0.80 of every premium dollar on health care-related activities, and are prohibited from setting annual or lifetime limits on insurance plans. Beginning in 2014, individuals will no longer be denied coverage because of pre-existing conditions in any of the 50 new affordable insurance exchange marketplaces. And these markets will be available to tens of millions of Americans who have no coverage today.

This law has begun to move the health sector away from volume-driven payment mechanisms to payments based on outcomes. With incentives from the U.S. Department of

Health and Human Services, health stakeholders are exploring new globalized, bundled, and capitated approaches. Doctors increasingly are getting out of the business—and back into the practice—of health care.

Finally, the act has already made a lasting impact on our health care infrastructure. Accountable care organizations, for example, are bringing health stakeholders together in constructive efforts to improve the coordination and quality of health care delivery.

There has never been a more promising moment for health care in America. The Affordable Care Act won't end the health care crisis. But it presents the best hope we've had in history to do so.

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**William Frist:**

At the time Barack Obama was elected President, a poll of registered voters showed that they unequivocally identified cost, not expanded insurance, as the most important health care crisis. Fifty percent of respondents identified “making health care and health insurance more affordable” as their top health issue while only 23 percent named “expanding health insurance coverage for the uninsured.”

In interviews, candidate Obama also identified cost as the

root crisis: “My view is the reason people don't have health care ... is they can't afford health care, and so I emphasize reducing costs.”

Thus, if the primary crisis is indeed cost, and, if we are to judge the success of the Affordable Care Act by how well it addresses this issue, the law will fail miserably.

That is not to say that expanded coverage for 25 million people is not a significant accomplishment. It is. Nor is it to say that, if proven effective, the tiny demonstration projects like episode-based reimbursements may not one day have some impact.

But with this law, health care spending will increase by more than \$1 trillion. New mandates and new coverage for an additional 25 million people cost new money. Expect more costs. In April 2010, the Centers for Medicare & Medicaid Services estimated that the law's coverage provisions would cost taxpayers \$828 billion over ten years. In July 2012, the Congressional Budget Office increased that estimate to \$1.168 trillion.

And there are the hidden costs. Chief Medicare Actuary Richard Foster has warned that the law could drive 15 percent of Medicare service providers into the red and that Congress would likely need to act to prevent the

**Thus, if the primary crisis is indeed cost, and, if we are to judge the success of the Affordable Care Act by how well it addresses this issue, the law will fail miserably.**

loss of these providers and the resulting steep loss of access among beneficiaries.

Do Americans think “Obamacare” is a success? No.

Most want to repeal it. According to Real Clear Politics, an averaging of the largest 22 polls conducted over the past six months reveals that more than 50 percent of respondents favor a repeal of the law, with only 40 percent opposing.

No one can accurately predict the full impact of the new law on total costs. But we do know that so far in the implementation process, of those who say they have been negatively affected by the law, 53 percent mentioned cost as the reason for their response.

The health care crisis is real. At the core of the crisis is a sector that encourages higher and higher costs. “Obamacare” is insurance expansion, not system reform. You can't honestly and responsibly promise everybody everything in tough economic times without reforming the machine that is generating the exploding costs. That is the task ahead.

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*William Frist '78, former U.S. Senator from Tennessee, former U.S. Senate Majority Leader, and Chairman of the Board of Fellows at Harvard Medical School, is a partner in Cressey & Company, a private equity firm in Nashville that focuses on the health care industry. Among his many affiliations, Frist is the chair of Hope Through Healing Hands, which aims to promote health as an avenue to peace worldwide.*

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*The opinions presented are those of the contributors and do not necessarily reflect those of the President and Fellows of Harvard University or the publishers of Harvard Medicine magazine.*





**HAIR'S BREADTH:** Adam was 15 when Doug Auld painted this portrait of him. Three years earlier, Adam had been burned during an outing with friends. Gasoline that had been poured in a shovel and lit exploded and splashed over him. He ran home, where his father doused the flames, but his injuries required him to be placed in a coma for three weeks and to undergo three operations. A compassionate young man, Adam often grows his hair long solely so that he may have it cut and donated to groups that serve people who have lost their hair as a result of disease.





New technologies,  
techniques offer balm for  
the wounds of those burned  
by Elizabeth Dougherty

# surface tissue

●  
**A few years ago**, an article in the *New York Times* piqued the interest of Jeffrey Schneider. The story featured Doug Auld, a New Jersey-based artist, and showcased his paintings of burn victims. The portraits—poignant, detailed, provocative—captivated Schneider. These were people he knew. Not personally, mind you. None had been his patient at Spaulding Rehabilitation Hospital. Instead, Schneider recognized a spirit: an unswerving gaze that delivered a quiet challenge; a posture of pride that spoke of surviving trauma and confronting emotional pain. Schneider, an HMS assistant professor of physical medicine and rehabilitation and medical director of Spaulding's trauma and burn program, invited Auld to the hospital. ■ Auld accepted and, as Schneider suspected, his presentation resonated with the hospital's burn-care staff. But it was the strong positive reaction from patients, families, and other hospital staff to an exhibit of Auld's work that was most gratifying to Schneider.





**HIS BROTHERS' KEEPER:** In 2005, at age 21, Jelani stood for this Doug Auld portrait. Eight years earlier, Jelani and his two younger brothers had been caught in a fire that raged through their apartment. Jelani got his brothers to safety but then the flames forced him to the back of the dwelling. To escape, he jumped from a window, breaking both legs, an injury that eventually led to the amputation of his right leg.



**Some of the early landmark efforts to improve the outcomes of patients with severe burns grew out of work at HMS by investigators such as John Burke '51.**

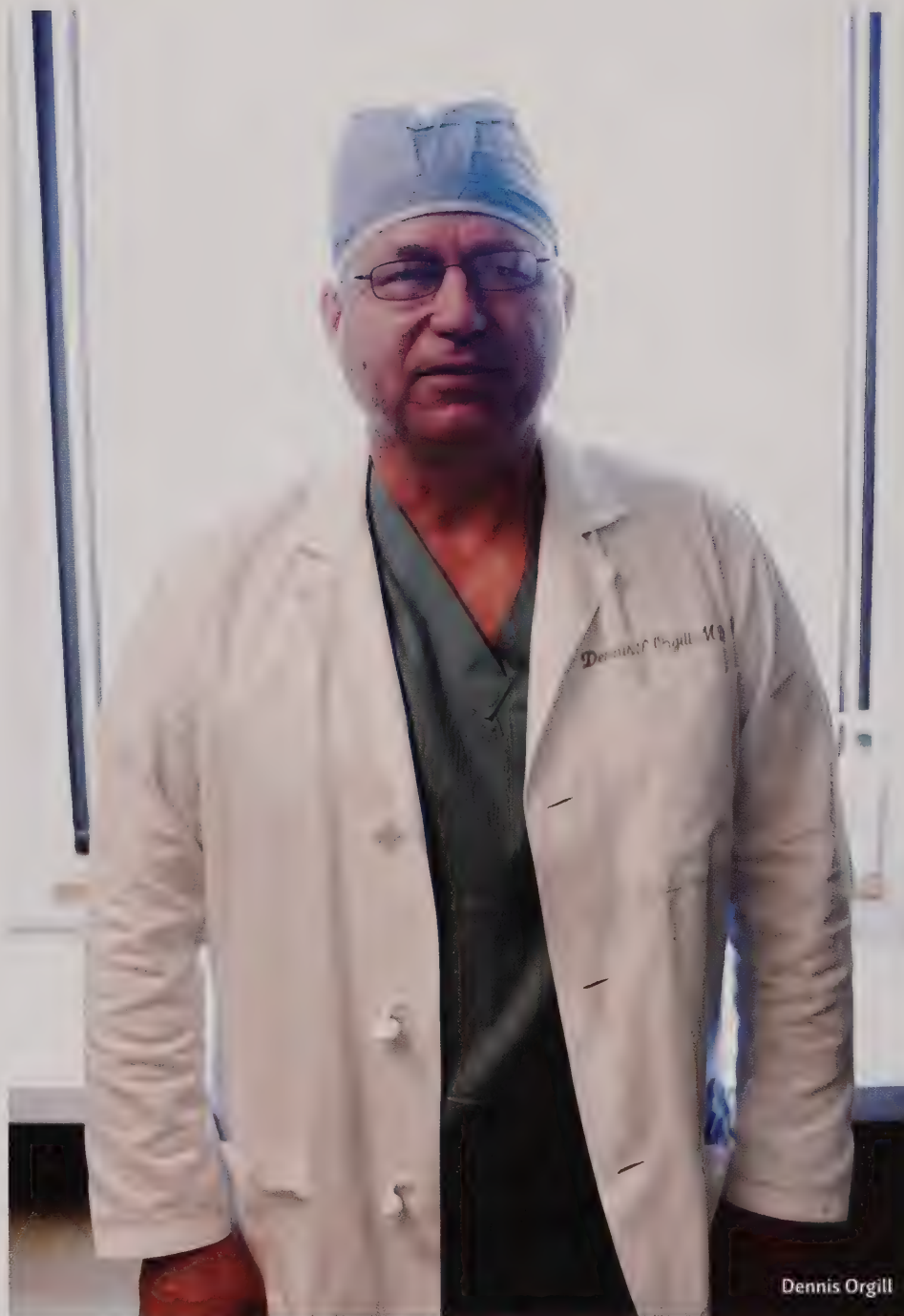
"To be the subject of a painting is empowering," says Schneider, "and that strength was evident in the portraits. This is not the sort of art the public often sees."

"It's hard to say whether people thought the paintings were beautiful," he adds. "But I think the purpose of art is more than just its aesthetic. Its beauty is in its purpose." The same could be said of the work of the scientists and clinicians who advance the care and treatment of those who suffer severe burns.

Investigators in the field continually work to develop better methods for treating severe burns that consume the skin's outer layer, the epidermis, and its physiologically complex inner layer, the dermis. Their work is not only delivering technical advances that improve the quality of life of burn patients; it is also helping in the development of synthetic skin that rivals the function and appearance of the real thing, bringing the prospect of a full-service, tissue-engineered artificial skin within reach.

#### Taxi Lab

Today, in the United States, 96 percent of the patients admitted to burn centers each year survive. Yet that high percentage is tempered by others: approximately 30 percent of patients with third-degree burns experience extensive scarring and lost mobility, while quality of life is diminished for nearly 70 percent because of pain and itch caused by pervasive nerve damage.



Dennis Orgill

Some of the early landmark efforts to improve the outcomes of patients with severe burns grew out of work at HMS by investigators such as John Burke '51. In 1979, Burke, who then headed the Shriners Burns Institute at Massachusetts General Hospital, partnered with biological engineer Ioannis Yannas at MIT to create a regenerative healing template, essentially what would become the first synthetic temporary skin

substitute. Their initial aim, however, had been more modest: to reduce the extensive scarring that resulted from mesh grafts, skin patches that have slits incised into the undersurface to aid adhesion.

The team focused their efforts on the dermis because, unlike the epidermis, it does not spontaneously regenerate. In addition, the dermis of scarred skin differs physically and functionally from undamaged dermis.





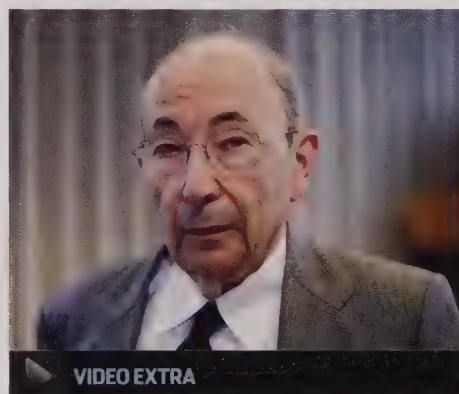
**WITH HONOR:** Doug Auld painted Shayla in 2005, nine years after fire had covered most of her then five-year-old body with severe burns. Although her injuries deprived her of her fingers, she succeeded in learning to play the piano. She also excelled academically while in high school, becoming an honor student and class president.



"In scarred dermis, the collagen gets assembled in small fibers oriented compactly together, like the material in a lab coat," explains Dennis Orgill '85, an HMS professor of surgery at Brigham and Women's Hospital. Orgill was a medical engineering student in Yannas's laboratory during the years of collaboration with Burke. "In undamaged dermis, the collagen fibers are wavy and they interlace, like the fibers of a knitted sweater, so the tissue is flexible."

To decipher how to encourage damaged tissue to regain flexibility as it heals, Burke and Yannas considered the cellular changes found in frozen-cadaver skin grafts. Freezing killed the cells, leaving a collagen matrix into which new cells could grow. To mimic this process, the team created a matrix of bovine collagen and shark cartilage. As the skin cells regenerated, the matrix degraded. In 2002, this semisynthetic template, now known as Integra, was approved for use by the U.S. Food and Drug Administration.

Around the same time that Burke and Yannas were engineering their template for skin cells, Howard Green '59, then at MIT and now the George Higginson Professor of Cell Biology at HMS, was experimenting with keratinocytes, the cells that form the



VIDEO EXTRA  
Skin Engineering: The beginning of therapy with cultured cells  
[hms.harvard.edu/content/skin-engineering](http://hms.harvard.edu/content/skin-engineering)

skin's epidermis, to determine how to grow generations of the cells in a laboratory dish.

When Green succeeded in cultivating keratinocyte stem cells and in growing enough of them to form a thin sheet of skin cells, he contacted Nicholas O'Connor, then head of the burn unit at the former Peter Bent Brigham Hospital, to talk about using the sheet as a skin graft.

Green and O'Connor debuted the use of the engineered graft, now called EpiCel, on the burned arm of an adult man. O'Connor took a postage stamp-sized skin biopsy from the man, and Green cultivated the cells to form sheets of tissue. As each sheet of cells filled the Petri dish in which it was growing, Green would shuttle it by taxi to O'Connor, who would graft the sheet onto the man's wound. The grafts worked: Green's technique marked the first successful growth of skin from stem cells.

### With Open Arms

The work of Burke, Green, and other pioneers in the field set the stage for the technical advancements of recent decades. Take the problem of contractures, the almost crippling tightening of joints and skin that can accompany the formation of extensive scar tissue. Even in the most advanced burn-treatment centers, more than 30 percent of patients leave with contractures that make getting back to work, or to any sort of normality, a challenge.

Physical therapy can help. Patients stretch frozen joints with exercises and, in extreme cases, says Schneider, doctors will do serial casting; that is, flexing a joint into an open, extended position with a plaster cast for a few days, releasing it, then extending it and setting it again in a cast.

In the hope of eliminating this repetitive, often painful, procedure, Schneider devised a novel game-based approach for treating contractures. Patients play a typical joystick-controlled video game, only in this case, he says, "the arm becomes the joystick."

Schneider designed the intervention for children who may have trouble motivating themselves to perform repetitive exercises. The child straps on a robotic exoskeleton and uses his or her arm to play the game. As mobility improves, the robotics can be adjusted so that the patient stretches farther.

"Children who experience discomfort when they try to bend their elbow ten times in a row, will, when immersed in the game, often not even think about what they are doing," says Schneider.

**Jeffrey Schneider devised a novel game-based approach for treating contractures. Patients play a typical joystick-controlled video game, only in this case, he says, "the arm becomes the joystick."**





Schneider is also investigating methods for eliminating the chronic pain and itch that burn victims report. Using a process called transcranial direct current electrical stimulation, which delivers a mild, 2-milliamp current into the dorsolateral prefrontal cortex, the region located just behind the forehead, Schneider and his research team have demonstrated changes in the abnormal brain processes that are involved in pain, changes that could potentially be used to effectively lower patients' pain thresholds.

### Fine Tuning

In contrast to Schneider's function-related aids for burn sufferers, Orgill has been working to recreate the complicated physiology of skin.

"We've delivered real solutions that help patients today," he says. "But we are still working on refinements, such as reproducing proper pigmentation and regenerating sweat

glands or hair follicles. And we're still trying to get the texture of the epidermis right."

Although Orgill spends much of his time wearing scrubs and working in the surgical theater, he still thinks and acts like an engineer. "There are three knobs to turn when it comes to healing the wounds of burn victims," he says.

One involves improving the template into which new skin regenerates. Orgill continues to tweak the thickness and the conformation of collagen in the regenerative template he developed decades ago, looking for combinations that speed healing and prevent infections. In areas where the dermis is comparatively thin, such as around the eyes, Orgill is trying to determine whether a thinner matrix would provide a better foundation for healing.

The second knob involves biologics, the actual cells and growth factors that go into the matrix. In his wound-research lab at Brigham

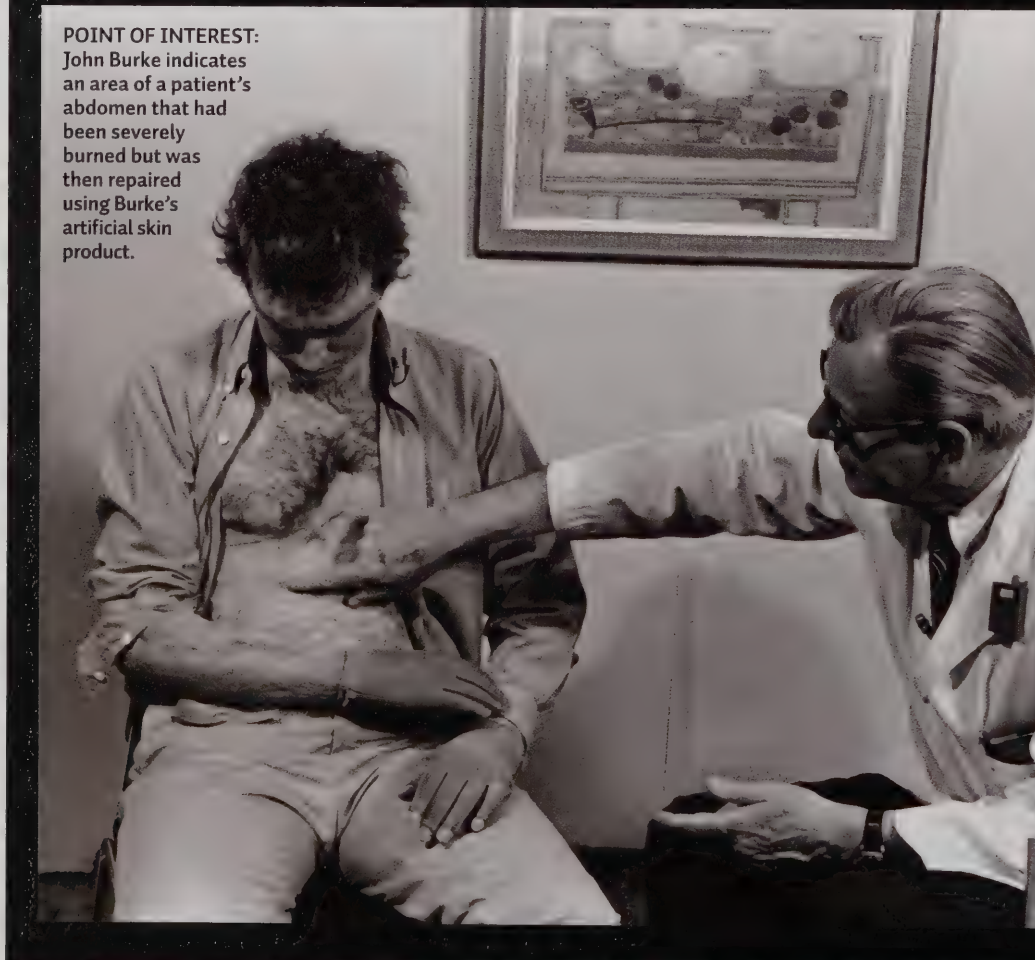
and Women's, this work is slowly progressing. "People think wounds are homogeneous," says Orgill, "but there are many types of wounds. It is unlikely that just one growth factor is going to make a big difference for all wounds." So Orgill is instead focusing more broadly: He's working to figure out the science behind the healing influence of platelets, which release multiple growth factors that help form blood vessels and close wounds.

### A Knob to Progress

The third knob involves mechanics. Orgill discovered that applying micromechanical forces to burn wounds speeds and improves their healing. The discovery was serendipitous. Orgill's original intent had been to find a better method for removing fluid from wounds; eliminating fluid can improve graft adhesion and lessen the possibility of bacterial growth and infection. When his research team used a vacuum suction to remove fluid, they found the

#### POINT OF INTEREST:

John Burke indicates an area of a patient's abdomen that had been severely burned but was then repaired using Burke's artificial skin product.



## TINKER, TAILOR

An HMS surgeon looked to engineering to aid the severely burned

Throughout the spring of 1980, ten severely burned patients were admitted to Massachusetts General Hospital. Their skin charred and stripped by third-degree burns, the patients risked shock, severe infection, and dehydration. John Burke '51 and his team readied themselves for each surgery, which they believed would not only save the patient but might forever change the standard of care for severely burned patients.

Those expectations rested on findings that Burke, then chief of staff at the Shriners Burns Institute at Mass General and later the School's Helen





Donald Ingber

action produced “phenomenal responses when it came to the overall healing of the wound,” Orgill says.

Since then, Orgill has found the explanation behind the result: a slight tug on the healing cells promotes the activity of mast cells, which are key to cellular regeneration. It also seems to improve the formation of blood vessels, leading to the development of vessels that are thinner and less convoluted than those often found in regenerated skin tissue. Orgill has teamed up with another HMS researcher, Donald Ingber, director of the Wyss Institute for Biologically Inspired Engineering and the Judah Folkman Professor of Vascular Biology at HMS and Boston Children’s Hospital, to develop advanced micromechanical wound-healing devices.

Ingber’s research team is also investigating ways to incorporate micromechanical environments with biochemical and cellular environments to

achieve lifelike tissue. They have had success applying this principle to the creation of a series of biomimetic organs-on-a-chip that include a breathing lung and a peristaltic gut. Skin-on-a-chip, they hope, is not far off.

The hope for lifelike skin tissue has loomed as large for clinicians in burn units as it has for burn sufferers. “Patients want what you would want,” says Orgill. “They want skin that looks exactly like their own.”

From laboratory to burn unit to rehabilitation hospital, researchers at the School have been changing the fortunes of burn patients with advancements that allow them to survive and, more and more often, to resume their lives. Yet each advancement, and each patient, brings a renewed awareness of what there is left to do. In science as in art, the beauty is in fulfilling that mission. ■

*Elizabeth Dougherty is an author and science writer based in Massachusetts.*

Andrus Benedict Professor of Surgery, and his collaborator Ioannis Yannas, an MIT professor of mechanical and biological engineering, had reported in a paper on the design of an artificial skin.

Prior to their research, treatment of severe burns required quick surgical removal of all badly burned skin, followed by covering the wound with skin grafts taken from an unscathed part of the patient’s body. Although this two-step procedure lowered infection rates and improved chances for survival, it also carried risks. Surgical placement of skin grafts is complex and requires adequate donor sites on the burn patient from which to harvest graft material. In large burns, this can mean repeated surgeries so that donor sites can heal and be re-harvested. Or, it can mean using grafts from other human donors, an option that requires the use of powerful immunosuppressant drugs to avoid graft rejection.

Wanting to improve these patients’ outcomes, Burke and other scientists looked for new ways to replace the lost skin.

Burke had not planned to become a burn-treatment pioneer; he had been studying chemical engineering at the University of Illinois when World War II began. The war inspired him to reconsider his career, and in 1947, he enrolled at HMS with the goal of becoming a surgeon.

Medical school may have made Burke a surgeon, but he remained an engineer at heart. He recognized, for example, that replacing a component of the body with a material that would allow normal functioning required an engineering solution. In 1969, Burke joined Yannas on his search for a skin substitute. Their collaboration lasted 11 years and produced the first artificial skin used in surgery. The material they developed is now known as Integra.

To the eye, their invention looks like a thin, stretched-

**To the eye, their invention looks like a thin, stretched-out jellyfish composed of two layers—one organic, the other synthetic.**

out jellyfish composed of two layers—one organic, the other synthetic. The first layer, designed to provide the base for a new dermis, is a scaffold of collagen and glycosaminoglycan, a substance found in shark cartilage. The second layer, made of silicone, is designed to protect the wound from infection and moisture loss. The collagen-glycosaminoglycan scaffold provides a surface into which cells can grow, a process

that eventually causes the scaffold to break down and dissolve. The silicone material is removed after enough new skin has been generated.

The ten patients who entered Mass General that spring survived. The artificial skin developed by Burke and Yannas was declared a success; it had allowed the patients to grow a new dermis that was nearly scar-free.

“He had the ability to see the subtle changes in a disease process that made a big difference in medical practice,” says Peter Burke, chief of trauma services and professor of surgery at Boston University School of Medicine, and John Burke’s son. That ability led Burke to leave what may be his legacy to medicine—a product that bridges the gap between engineering and biology to provide an artificial skin for patients with third-degree burns. ■

*Charli Kerns is a science-writer intern for Harvard Medicine magazine.*









Diagnosing brain injuries  
poses challenges that  
researchers are rising to meet  
by Elizabeth Dougherty

# Looking into the Matter

**Less than a handful** of years ago, Joseph Giacino was readying for an appearance on the *Charlie Rose* program. The PBS show, which features discussions between journalist Rose and various newsmakers, had invited Giacino, director of rehabilitation neuropsychology at Spaulding Rehabilitation Hospital, and other experts to talk about the state of treatment for traumatic brain injury. ■ For about a decade, Giacino had been investigating this type of injury with the goal of discovering a way to help patients recover from its more severe forms. He had been exhaustively characterizing the capabilities of patients in minimally conscious and vegetative states and also had been searching for drugs that might promote recovery. ■ So when the show's producers invited Giacino to talk about the state of the science in this field, they were confident they had the right expert. They may not, however, have been fully prepared for Giacino's opening statement: "There's not a single proven treatment for traumatic brain injury at present."

**ON TRACT:** Martha Shenton and colleagues used a version of diffusion tensor imaging to determine the pathways of white matter fibers that travel through the brain's corpus callosum.





**GAINING INSIGHT:** Researchers (left to right) Ross Zafonte, Martha Shenton, Joseph Giacino, and Kit Parker are exploring new or devising improved methods for detecting and treating traumas to the brain.



### Something from Nothing

Interest in gauging the damage from and devising treatments for traumatic brain injury has only increased since Giacino and Rose talked. Awareness of the toll that brain trauma takes among athletes and those in the military has crescendoed. In the past 12 years, in fact, an estimated 320,000 military personnel have experienced some form of neurological trauma during their deployments in Iraq and Afghanistan.

But researchers may be poised to provide physicians with ways to recognize even the mildest form of these injuries. New diagnostic tools in imaging, brain stimulation, and molecular biology are emerging, and, together with other technologies, are also giving researchers insights into how to develop targeted therapies.

### Map Quest

These developments are welcome news to the medical community. Each year in the United States, 1.7 million people seek medical attention for traumatic brain injury. As large as that number may seem, it's probably conservative because many people never seek help for concussions or similar mild brain injuries they incur. This knowledge leads many experts to call traumatic brain injury the "silent epidemic."

Between 15 and 30 percent of those who suffer mild traumatic brain injury endure chronic headaches, depression, post-traumatic stress, and memory and cognitive impairments. Ross Zafonte, the Earle P. and Ida S. Charlton Professor of Physical Medicine and Rehabilitation at Spaulding Rehabilitation Hospital, likens these mild forms of brain injury to a disease: A light bump or the reverberations

from a blast can trigger a chain reaction of inflammation and neurodegeneration that may continue for years.

Zafonte and Martha Shenton, an HMS professor of psychiatry and radiology at Brigham and Women's Hospital who uses diffusion tensor imaging to study neurological disease, have been working to develop imaging tools that can detect these mild forms of brain trauma. When they began their collaboration in 2007, "there was nothing to see," says Zafonte. Conventional imaging techniques, such as MRI and CT scans, did not show abnormalities associated with mild trauma.

The price of such blindness is high. X-rays help doctors diagnose fractures. Biopsies are used to diagnose cancer. "In medicine," says Shenton, "you have to be able to detect and diagnose something before you can treat it." Shenton and Zafonte hope diffusion tensor imaging will allow such insight. One of its measures, known as fractional anisotropy, works by measuring the rate and direction in which water diffuses in the brain.

Shenton demonstrates the concept by comparing the way a water droplet spreads on a tissue versus its movement on newsprint. On a tissue, water is not constrained; it spreads in all directions equally to form a perfect circle. On newsprint, however, water is constrained, moving along the fibers in the paper to form an ellipsoid. In the brain, water that is constrained has been stopped by a barrier, a fact that provides information about the structure of the tissue. Water is constrained along a fiber tract in white matter, for example, while cerebrospinal fluid provides no such constraints. The technology has

proven useful for capturing images of some previously invisible neurological wounds. One such wound is diffuse axonal injury.

In diffuse axonal injury, the axon that extends from the body of a nerve cell tears or stretches, causing chemical imbalances and cytoskeletal disruptions that change the way water is constrained. These subtle changes can be captured by diffusion tensor imaging. Shenton's lab has recently refined the technology, adding new analytical techniques that can distinguish neuroinflammation from neurodegeneration.

The information conveyed in a diffusion tensor scan also is more nuanced than that displayed by imaging tools such as x-ray. Unlike most skeletal injuries, brain injuries are highly variable. So Shenton and her team are building a brain atlas composed of averaged measures from scans of normal, uninjured brains. When a scan of a traumatized brain is compared to measures in the atlas, the measures of injured areas fall outside the norm.

In analyzing the scans, researchers are starting to see patterns emerge. "As we get more refined imaging techniques, we're beginning to see differences between blast-related injuries, auto accidents, and falls," says Zafonte.

Shenton and Zafonte are using the atlas in a randomized clinical trial to study whether the anti-inflammatory diabetes drug glyburide might be effective in reducing the neuroinflammation that results from mild traumatic brain injury. Shenton believes that





soon the atlas could be used in the clinic to identify and diagnose brain injury.

### Chip Ahoy

For Kit Parker, a founding core-faculty member of the Wyss Institute for Biologically Inspired Engineering and Harvard University's Tarr Family Professor of Bioengineering and Applied Physics, an interest in understanding brain injury sprang from his military service in Afghanistan. "People were trying to kill me with IEDs, so I figured I better start working to understand the injuries those devices were causing," he says.

Parker began researching the literature on integrins, a type of protein that anchors cells to their surroundings. Integrins are essential for the growth of cardiac tissues, Parker's area of expertise; since coming to Harvard, he's been working on heart-on-a-chip technology. These proteins translate

mechanical signals from outside a cell into chemical responses inside a cell, a transformative ability that Parker thought might help explain the chemical cascade caused by a blast-induced brain injury.

His literature search yielded nothing. So he and a student sat down for coffee, and, hunched over a napkin, began sketching out what would become the first study of the role of integrins in brain injury. Their plan? Construct a brain-on-a-chip.

For their investigation, the researchers secured individual rat neurons to stretchy silicon and, in an effort to simulate the effects of a blast, subjected the silicon sheet to a quick pulse of energy. Parker found that forces too small to disrupt the cell membrane could still disrupt the focal adhesion complex—that is, the connections that integrins build from the cytoskeleton through the cell membrane and into the extracellular environment. Such a disruption triggers an injury-inducing signaling cascade within a neuron. Parker thinks that blocking this cascade with a neuroprotective agent of some sort would be an effective way to prevent progressive brain injury.

In Parker's view, the search for neuroprotective interventions is crucial: improvised explosive devices aren't going away anytime soon. On the battlefield, the need for medical tools that can be used to diagnose and mediate the injuries IEDs produce is devastatingly clear. "If I pull you out of a blown-up vehicle and you're bleeding, I can use a tourniquet to help stop the blood loss," says Parker. "But if you're experiencing the earliest triggers of the chemical cascades that cause brain injury, I've got no first aid for that."

### Light Work

Michael Whalen, an HMS associate professor of pediatrics at Massachusetts General Hospital, is working on near-infrared brain stimulation that could be just the kind of first aid for brain injury that Parker is seeking. Whalen's vision, however, centers not on a neuroprotective agent but on a device; specifically, a helmet that shines healing light on an injured brain.

Whalen's idea is grounded in work done four decades ago. Shortly after the first working laser was built, Hungarian physician Endre Mester used an animal model to determine whether skin, shaved of hair, developed cancer when exposed to laser light. To his surprise, he found that the hair on animals treated with the laser grew back

faster than it did in a control group. Mester had discovered the phenomenon now called laser biostimulation.

Whalen uses the same principle to treat traumatic brain injury. By directing specific wavelengths of near-infrared light onto the heads of animals that experienced controlled cortical impact, Whalen has been able to improve the animals' cognitive function outcomes and to reduce post-trauma brain inflammation.

Even though the therapy is considered a safe treatment for certain conditions in humans, Whalen continues to focus on perfecting the technique in animal models to better understand how cellular changes translate into neuroprotection and improved healing of brain injuries. If all proceeds as he hopes, Whalen expects to see neuroprotective helmets in the backpacks of army medics and on the sidelines of professional football games within the decade.

### Fast Forward

Whalen's research, together with the efforts of others in the field, have awakened interest in traumatic brain injury research. In May, Giacino, whose statement to Charlie Rose's audience starkly described a field in need of progress, was part of a research team that produced the first successful results of a clinical trial of a treatment for this injury. The study, codirected by Giacino and John Whyte of the Moss Rehabilitation Research Institute, showed that the drug amantadine, now used for Parkinson's disease, helps patients with severe traumatic brain injury recover more quickly. "We finally have evidence that we may be able to do something to help these patients get better," says Giacino.

With new diagnostic and investigative tools, clinicians and researchers no longer need to reason around an impenetrable black box. As a result, the conversations in the field today are focusing on how to bring it all together: how to leverage new imaging tools and biomarkers to track patient progress in clinical trials, how to use brain-on-a-chip models to screen potential drugs, how to combine pharmaceutical and brain stimulation therapies, and how to know when to apply one or the other. For those with traumatic brain injuries, it all adds up to one healthy dose of hope. ■

*Elizabeth Dougherty is an author and science writer based in Massachusetts.*

**Between 15 and 30 percent of those who suffer mild traumatic brain injury endure chronic headaches, depression, post-traumatic stress, and memory and cognitive impairments.**









# child's play

**Make-believe can be serious business**  
by Valerie Wencis

**For children whose lives** are interrupted by illness, the power that play brings to healing and wholeness cannot be overestimated. Be they toddlers or teens, youngsters crave opportunities to express their thoughts, their creativity, and their emotions. Much of that self-expression comes through play. Increasingly, medical professionals are integrating play into the daily regimens of young patients in hospitals. From books to board games to bicycles, the forms of play available to pediatric patients are as varied as the ailments that bring them to the hospital. But the need for play, and the outlet it provides, remains constant.

## Star Dust

Suzanne Graca holds a wand filled with stars. Smooth and cool to the touch, the small stick shimmers when held in the light. When she waves it, the stars tumble, revealing sparkles of red, blue, and gold. Graca hopes their movement will mesmerize her young patient. If this works, the test, treatment, procedure, or examination that brought the tiny patient to the big hospital will seem less frightening. This is the magic of the child life specialist.

Graca, who is Child Life Education Coordinator at Boston Children's Hospital, describes her work as helping children be children by normalizing the hospital environment. That sense of normal is found through play. "It's amazing to see how play can transform children who are enduring painful and sad situations," Graca says. "Play is their world. It's how they communicate, how they comprehend their environment, so we use play in what we do. It can be truly magical for the patient and family."

Graca taps into that magic when she seeks to distract pediatric patients who are about to undergo difficult procedures. By calming a child, Graca can sometimes eliminate the need for the young girl or boy to be restrained or anesthetized during a procedure.

The bag of tricks Graca pulls from is stuffed with the ABCDs of distraction, a toolkit of care developed by the interdisciplinary pain committee at Children's. The mnemonic guide refers to the use of assorted visuals, like the wand filled with stars; breathing exercises; comfort measures; and diversionary talk when helping patients prepare for or deal with pain.

Inducing relaxation by getting a child to blow bubbles, for example, is fun for the child and far more effective than saying "take a deep breath." Likewise, comfort can be gained from snuggling in a blanket from home rather than one from the hospital. Even a child's position—lying flat or sitting upright—can influence comfort. Often, Graca will invite the patient to sit on the parent's lap so that the youngster feels more in control and less anxious.

Graca builds her care plans by drawing on her child-development training, determining the approach and form of play most appropriate to the patient's developmental stage, while also keeping in mind that "everyone regresses a little when ill."

**GAME PLAN:** Child life specialists such as Suzanne Graca at Boston Children's Hospital use blocks, wands, and other less-than-conventional health care tools to help young children handle the rigors of being hospitalized.

JOHN SOARES





**STAGECRAFT:** Play helps children cope with their worries about disease, and watching young patients play can assist child psychiatrists such as Paula Rauch at MassGeneral Hospital for Children in interpreting those worries and in conveying them to clinicians and families.

Although Graca's resume includes the title of Instructor of Child Life and Family Studies at Wheelock College, it is the unofficial one of Play Lady that may mean the most to her. "If a child calls me a play lady, that means I'm doing my work," she says. "Children need more than medicine to get through the difficult experience of being in the hospital. They need the freedom of expression that comes through play."

#### Timed Release

Paula Rauch's desk at MassGeneral Hospital for Children, the pediatric hospital of Massachusetts General Hospital, is guarded by a fortress built of translucent blocks; the office door is flanked by a child-sized doll

house. Sunlight glints off the suspended figurines of angels and dancers before lending a glow to silver pillows plumped on a couch. A shelf above her desk serves as a perch for a framed illustration, a reminder of when Rauch, an HMS associate professor of psychiatry at Mass General, served as an ongoing consultant on *Arthur*, the popular PBS cartoon program.

From her 30 years at Mass General, Rauch knows well the trying experiences that face families who must deal with disease. "A four-year-old, once admitted to the hospital, might not realize that he or she won't live in the hospital forever," explains Rauch. "So, while everyone may be nice to them, from a child's perspective, if you think you can never go

**Child psychiatrists, in particular, work to identify emerging mood or anxiety symptoms as well as emotional symptoms associated with certain medications or disorders.**

home again, it's like being a prisoner. A child psychiatrist's role is to help the medical team see things from the child's viewpoint."

At Mass General, child psychiatrists and child life specialists share a commitment to supporting the emotional health of their young patients. Child psychiatrists, in particular, work to identify emerging mood or anxiety symptoms as well as emotional symptoms associated with certain medications or disorders.

According to Rauch, young children have a greater chance of coping successfully with worries about disease if medical teams give them the opportunity to express their worries through play. And if a child life specialist, a child psychologist, or a child psychiatrist is allowed to observe that play, to essentially see those worries in action, that professional can then interpret and share the child's concerns with clinicians and family.

While play can help children comprehend and cope with illness, the precise type of play can vary, says Rauch. Patients under the age of three are most comfortable with their parents. So, when the goal is to support the child as he or she prepares for a procedure or a test, the clinicians may offer parents the tools to engage in supportive play. Children ages three to six have what Rauch calls magical thinking. "Everything happens for a reason and the reason is them." Make-believe and other forms of expressive play help children in this age group demonstrate their fears about illness.

Children in elementary school organize their thinking around rules. They tend to generalize from their experience, imagining, for example, that everything is as contagious as a common cold. Talking with a child to determine what these misconceptions are is an important step toward helping to alleviate their worries.



The need for independence grows during adolescence, thus adolescents seek to express themselves creatively through art, watching movies, playing videogames, and connecting with friends virtually.

The continuum of development brings challenges to health care professionals who wish to help children cope with hospitalization. Giving children a chance to ask questions about their illness, and respecting their perspectives on their experience, says Rauch, keeps children from being confused and enables them to develop a healthy outlook as they move forward.

### Child, Interrupted

Mary Patstone strides through the halls of Spaulding Rehabilitation Hospital and out to its patio and pier that rest along Boston's Charles River. The river sparkles in the sun as Patstone surveys the equipment and gear she uses to introduce youngsters to cycling, kayaking, rock climbing, and other sporting and recreational activities that are available to patients, despite their physical challenges.

"We're fortunate to have the pier right here on the campus, so we can get our patients out on the water before they leave the hospital," says Patstone, who directs

the Spaulding Adaptive Sports Center's Dr. Charles H. Weingarten Adaptive Sports and Recreation Program in Boston, one of three such centers in eastern Massachusetts. That early involvement, she adds, increases the chance a patient will stay active after leaving the hospital.

Program coordinator and physical therapist Bobbi Delaney teamed with the MGH Institute of Health Professions to investigate the physical and psychosocial benefits of the adaptive sports program. Delaney's findings show that patients who participated in the program reported their athletic ability had improved an average of 65 percent in such physical components as flexibility, strength, endurance, and balance. The results showed a significant increase—to around 85 percent—in such psychosocial measures as confidence, self-esteem, and mood. In addition, 88 percent said they felt more motivated to exercise regularly. Delaney thinks these findings indicate that once individuals learn they can overcome barriers to their participation in physical activity by using adaptive equipment that optimizes their strengths, they are more likely to remain physically active.

"When kids are hospitalized and they can't play, a feeling of depression can really



hit them," Patstone says. "But if you can get children out and playing again, and feeling normal or as close to normal as they can, the healing process and progress increase."

As evidence, Patstone recalls Melissa, a young patient who entered the program after suffering a swimming accident that deprived her brain of oxygen, causing neurological damage that required her to relearn everything she had previously been able to do. Once in the program, with access to the outdoors, her recovery seemed to progress more rapidly, says her father. Although still a work in progress, the nine-year-old is back riding a bicycle and attending ballet class. She has even started rock climbing.

When kids feel normal, their parents begin to heal as well, says Patstone. "They can take a breath and go, 'Wow, she's laughing, she's having a good time. She's a child again.' That realization really bolsters the healing process."

The use of adaptive sports as a tool for rehabilitation is burgeoning as awareness grows for universal access, disability advocacy, and veterans' services. There are 40 adaptive sports agencies in Massachusetts alone, and Patstone helps some of them develop their own programs. Many of the programs, in fact, provide support for Patstone's former patients as they work to continue to build a healthy life.

Patstone sees this upward trajectory continuing. "I believe the adaptive sports arena will look dramatically different in ten years, as it benefits from more consistent oversight and the development of common goals."


If true, then more children who face disabilities resulting from accidents or illness can, like Melissa, look forward to enjoying a childhood that is just interrupted, not halted. ■



**RIPPLE EFFECT:** The adaptive sports program that Mary Patstone (left) oversees at Spaulding Rehabilitation Hospital provides children with the opportunity to participate in sporting and recreational activities with the goal of building their confidence so that they will stay active after they leave the hospital.

*Valerie Wencis is assistant director of the Office of Communications and External Relations at Harvard Medical School.*





**GIMME A PUG:** Phil visits a young patient during his rounds as a volunteer for Pawprints, the therapy dog-visitation program at Boston Children's Hospital.





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# Dog Tales

The trauma of illness can be  
soothed by the unspoken  
compassion of canines

By Charli Kerns

Photographs by John Soares



**GOODWILL AMBASSADOR:** Cosmo regularly visits Beth Israel Deaconess Medical Center, bringing a comforting presence that patients appreciate. Cosmo's owner, Risa Burns (right), an HMS assistant professor of medicine, accompanies him on his rounds.







Aimee Lyons



**When Phil walks** into Boston Children's Hospital, heads turn. Although he seems not to notice, Phil is not unlike other celebrities. He knows when those around him are paying attention. In fact, that's one of the aspects of his character that his coworkers at Children's admire. Phil can sense what patients need, usually without their saying a word. Most often that need is simply a

friendly paw. ■ Phil and his canine colleague, Cosmo, who works at Beth Israel Deaconess Medical Center, are visitation dogs, volunteers in one of the animal-visitation and animal-assisted therapy programs active at the hospitals affiliated with HMS. With their official hospital badges, calm temperaments, and repertoire of tricks sure to please any patient they encounter, Phil, Cosmo, and their dozens of tail-wagging fellow volunteers offer patients, families, doctors, and nurses a welcome diversion from the normal hospital routine. Yet the increasing presence of these working dogs at hospitals may signal something else: The growing use of pet therapy could represent a trend toward providing patients with a more holistic healing environment.

### Animal Instincts

The idea of using animals to help humans heal is not a new one. One of the earliest recorded uses of structured animal-assisted therapy was in ninth-century Belgium, where *therapie naturelle* was provided to handicapped residents of Gheel. In the late eighteenth century, animals were a part of an alternative treatment program provided to mentally ill patients who resided at the York Retreat, a Quaker-funded institution in England. The retreat's program eventually became a model for reform in similar institutions.

Research investigating the validity of animal therapy, however, lagged behind these clinical applications. Scientists did not begin to look critically at the psychological and physiological benefits of animal therapy until the late nineteenth century, when scholars were exploring the idea that humans are part of the animal kingdom and, therefore, subject to its laws. They also began to ponder the fact that behaviors originally attributed only to humans were displayed by other animals as well. These explorations eventually led to the development of animal studies, a cross-disciplinary field that investigates animal behaviors through anthropology, biology, history, psychology, philosophy, and sociology. By combining these perspectives, researchers hope to produce an understanding of human-animal relations, and, by extension, to better define what it means to be human.

Hospitals such as Children's and Beth Israel Deaconess are building upon these investigations by considering how the concepts behind human-animal relations can be applied to patient care. One route of investigation is through animal-visitation programs, such as those that employ Phil and Cosmo.

"As institutions are investigating how to be more patient-centered, they're looking at the emotional health of the patient, which could



have big implications for physical health,” says Aimee Lyons, director of nursing and patient services in the medical and surgical intensive care unit at Children’s.

Animal therapy is a goal-directed intervention program in which an animal that meets behavioral and health criteria can play an integral part in treatment. Health and human service professionals direct and deliver these programs with the goal of improving patients’ physical, social, emotional, and cognitive functioning.

### First in Show

An indication of how the dogs help achieve these goals can be seen in the visits Phil makes during a typical round. Sometimes he meets a child in his or her room. Other times, he waits for children to gather in the oncology floor’s playroom. On a recent visit, Phil waited patiently in the playroom for children to arrive. The first was a little boy who was straddling his mother’s hip, his face red from crying. The boy peeked down, and saw Phil. His teary eyes widened, and a shy smile crept across his face. Phil’s owner had brought along a hula hoop, and in no time, Phil was jumping through the hoop, sitting when asked, and performing other tricks that delighted the growing crowd of children in the playroom.

Although active performance can be part of their routine, Phil and Cosmo also know how to remain calm. This behavioral attribute is a critical requirement for any dog that becomes part of the hospitals’ volunteer visitation programs. The dogs, therefore, have to prove they’re up to the job. According to Lyons, the animals not only must test negative for certain parasites, they also need to pass inspection by an animal behaviorist and successfully complete simulation tests that determine whether they can handle the noise, commotion, and intense activity of a hospital. Only those animals that pass all the tests make it onto the floor. “These are the calmest dogs you will ever see,” Lyons says.

### Who Let the Dogs In?

Managing a dog-visitation program is one thing; getting that program approved in the first place is another. “It took us years to get one going at Beth Israel Deaconess,” says Barbara Sarnoff Lee, the hospital’s director of social work and patient/family engagement. According to Sarnoff Lee, having data that addressed safety and health concerns—and a respected physician to champion the idea—



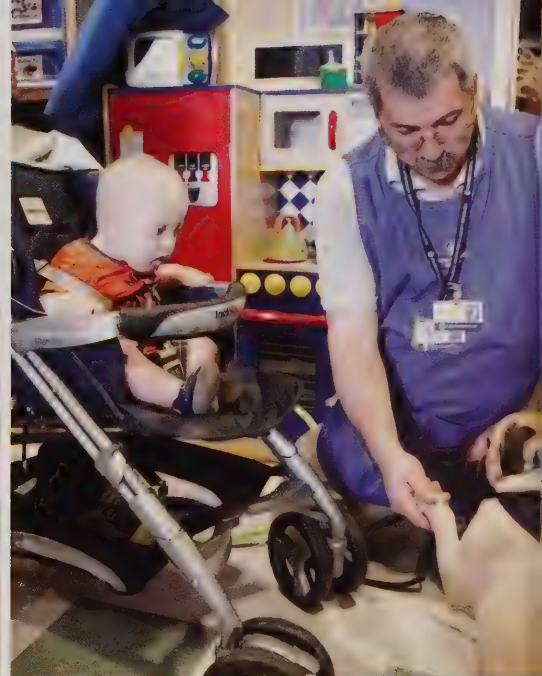
**HANDS ON:** Animal-visitation programs depend on hospital staff, such as Barbara Sarnoff Lee (above), and program volunteers. The patients look forward to touching, hugging, and even shaking the paws of their four-legged visitors, Phil (center, top) and Cosmo.

were key to making that hospital’s program a reality. Overall, two questions had to be satisfied: Would the animals serve as vectors for infectious organisms? and Would they be a source of allergens?

The vector worry focused on whether there was a risk that the dogs’ fur could contribute to the spread of fomite infections. Could, for example, the dogs carry the antibiotic-resistant strain of *Staphylococcus aureus* from room to room? According to Henry Feldman, an HMS assistant professor of medicine at Beth Israel Deaconess, dogs can carry these bacteria, but the animals’ fur is not a particularly effective carrier. The bacteria prefer to ride along with a living entity, which fur isn’t. “A dog’s coat is like any fur coat,” Feldman says, “and we don’t worry about people wearing a fur coat into a hospital.”

The concern about allergies centered on whether the animals might trigger asthmatic reactions. Even if the patient who scheduled a visit with a dog was not allergic, perhaps that patient’s roommate was. How could the entire hospital community be protected?

To address these concerns, physicians at Beth Israel Deaconess closely monitor the rates of infection and allergies to determine whether reports increase after visitation dogs come into the hospital. In the seven years




the program has been in place, there have been no spikes in either infections or allergic reactions. “We’ve shown the presence of the dogs to be as safe as anything else in this hospital,” Feldman says. “The patients love them, and that’s ultimately who we’re supposed to be pleasing.”

### Best Friends

The dogs that participate in animal-assisted therapy and animal-visitation programs do more than please patients, however. They remind them of their humanity. “People are more than just their illness,” Sarnoff Lee says. “They have lives outside our hospital, and those lives might include pets and other





**"The best thing about the dogs is that they don't care if you're having a bad day," says Lyons. "And they don't care what you look like. They're there for one reason: to give you love and companionship."**



animals. Having the dogs visit speaks to the whole patient, the whole person, not just the patient who has a particular illness."

Working with the whole person requires attention to more than just healing the physical body. This is an area in which the dogs come in handy. A significant body of research shows how animal-assisted therapy and human-animal interactions reduce stress and anxiety, and thus help improve psychological and emotional well-being. Studies have found that interactions with dogs and other domesticated animals can increase levels of the neurotransmitter oxytocin. Associated with reducing blood pressure and cortisol levels, oxytocin is also thought to lower anxiety and stimulate behaviors linked with well-being, such as positive social interactions. In addition, pilot studies designed to investigate alternative ways to control patients' pain have shown that interactions with dogs participating in hospital-based programs help lower pain thresholds.

As researchers continue to unravel the effects that animal-assisted therapy and

animal visitation can have on a patient's physical and psychological health, patients, families, and hospital medical personnel seem content to be part of the investigations. Phil, Cosmo, and their fellow volunteers also seem content with making the rounds at their respective hospitals, bringing with them the joy that springs from unconditional affection.

"The best thing about the dogs is that they don't care if you're having a bad day," says Lyons. "And they don't care what you look like. They accept you for who you are in the moment, regardless of how many tubes and lines are sticking out of you. They're there for one reason: to give you love and companionship." Despite, or, perhaps, because of, their lolling tongues, wagging tails, and eagerness to please, the visitation dogs do seem to carry a healing touch. This ability may not translate to data that can be entered on a patient's chart, but it certainly can be measured in smiles. ■

*Charli Kerns is a science-writer intern for Harvard Medicine magazine.*





A physician turns health care into hope for those living on the margins





# the streets where we live

**RING THE CHANGES:**  
The bell tower of the Iglesia de San Francisco in La Paz faces a motley array of contemporary housing, old and new coexisting in a vibrant city that beckons those seeking change, like the children who leave homes of abuse or poverty in the hope of a better life.

CERAD COLES/ISTOCKPHOTO.COM; KAYA CHILDREN INTERNATIONAL (ABOVE)

**Today the word refugee** evokes images of exodus, of the movement of people who have been driven from their homes by war, famine, or other cataclysms. To Chi-Cheng Huang '97, however, refugee has a more immediate meaning: someone seeking protection from harm. For Huang, that someone is most often a child living on the streets of La Paz, Bolivia.

In 1997, while a student at HMS, and well before becoming chair of hospital medicine at the Lahey Clinic in Burlington, Massachusetts, Huang heard a Bolivian missionary tell members of the congregation at Boston's Park Street Church about the lives of children living on the streets of La Paz. Congregants responded with generous contributions to support the missionary's work, but for Huang, a monetary contribution was not enough. He had confronted significant obstacles during his own childhood and, as a result, had developed a deeply ingrained empathy for children at risk. Huang responded to the call for help by setting his medical studies aside for a year and boarding a plane to Bolivia.

**by Michael Rafferty**



wounded, deeply



**TRAVEL PLANS:** Chi-Cheng Huang (above and far right) had planned to work with street children in Bolivia for 6 months but stayed 15 years, shuttling to Boston to finish medical school while also establishing an organization that would carry on his work.



## The Thick of Things

Stories about individuals responding to humanitarian crises are not unusual at HMS. Alumni and faculty are often among the first to respond to disaster or need. In 2010, doctors, nurses, and other medical personnel from the School and its affiliated hospitals streamed to Haiti within days of a powerful earthquake that devastated the island nation. David Walton '03, an HMS instructor in medicine at Brigham and Women's Hospital and deputy chief of mission to Haiti for Partners In Health, well remembers the scene that met him and his colleagues when they arrived on the battered island. Working in badly damaged hospitals, living in cramped quarters, and buffeted by more than 50 major aftershocks that assaulted the island, Walton recalls long days spent mending wounds, surgically repairing crush-related injuries, and supporting the spirit of a traumatized people.

The importance of treating the spirit as well as the substance has been emphasized in the work of Ronald Kessler, the McNeil Family Professor of Health Care Policy at HMS, and by the Hurricane Katrina Community Advisory Group he directs. In longitudinal studies conducted in the New Orleans region three years after the hurricane, the group reported high levels of anxiety and depression among those interviewed. More troubling, they found that since the storm, the incidence of serious mental illness has increased within the affected population. In short, Kessler reported, the severity and occurrence of emotional

trauma inflicted by such massive destruction can rise for several years after an event.

Kessler's work on trauma associated with natural catastrophe adds to the groundbreaking work of Richard Mollica, an HMS professor of psychiatry at Massachusetts General Hospital, who investigated the long-term effects of stress on populations subjected to war, genocide, and other human-induced trauma. In 1981, Mollica, responding to the mental health needs of newly arrived refugees from Vietnam and Cambodia, founded the Indochinese Psychiatric Clinic. Thirty years later, that clinic has evolved into the Harvard Program in Refugee Trauma in Mass General's Department of Psychiatry, where it continues to set the standard for treating the complex effects of extreme violence inflicted on whole populations.

Just as Mollica's work became a template for programs at other universities and medical centers, its structure has influenced that of the more recently established Harvard Humanitarian Initiative. Co-led by Michael VanRooyen, an HMS professor of medicine at Brigham and Women's, the initiative is applying analytic research methods to the field of humanitarian relief in an effort to bring evidence-based approaches to large, multi-institutional responses to natural and man-made calamities.

Yet before most large, heroic aid efforts begin, there is one person, perhaps two, who sees a need and works to meet it. So it was with Huang when he visited La Paz.

## Bag Diplomacy

Huang had arranged to volunteer at two of the orphanages in La Paz. Although he was still in medical school, he quickly became "Dr. Chi," treating wounds and illnesses with the meager supply of antibiotics and disinfectants available at the orphanages. Sometimes, he supplemented these supplies with those he purchased from local pharmacies with his monthly meal stipend. This was, after all, just going to be a short stint of public service, six months at the most.

Huang began to venture onto the city's darkened streets, sometimes on his own and sometimes with a staff member from one of the orphanages. Huang knew the street children would not readily trust an adult and that he would need to be creative and genuine if he was to win their confidence. So he filled a backpack with what turned out to be an effective set of tools: medical supplies, song sheets, and a soccer ball. A pickup soccer game or an impromptu singalong always drew a crowd of children.

Sometimes kids he had treated at one of the orphanages would help Huang break the ice. They spread the word that Dr. Chi was okay, and, in short order, new patients came out of the shadows to have him assess their ailments.

In the course of treating their physical maladies, Huang learned of the trauma





**Huang knew the street children would not readily trust an adult and that he would need to be creative and genuine if he was to win their confidence.**

inflicted upon their psyches. Most of the children had fled to the city from abusive homes, eventually finding kindred souls on the streets. The children learned how to earn a living in one of the available professions: thief, prostitute, or salesman, selling anything from potato chips to holy cards. They also discovered the cheap and reliable escape offered by sniffing yarn soaked in paint thinner.

The children Huang worked with were refugees in their own land, living on the streets by night but nearly invisible by day. Adults, they had quickly learned, didn't want to acknowledge their existence. But Huang got to know the street children by name. Some of them were children he began to think of as his own.

Huang realized he could not leave. Six months turned into 15 years, during which he split his time between La Paz and Boston while finishing medical school and residencies at Brigham and Women's, Mass General, and Boston Children's Hospital.

"I was burned out three or four times," Huang says, "and financially bankrupt twice." He realized he needed to get others involved, starting with the members of the Park Street Church. To no one's surprise, Huang proved adept at recruiting and fundraising. A nonprofit organization for the children was born.

#### Active Voice

Vaughn Mankey '01, who now has a private psychiatry practice in West Lake Hills, Texas, was one of Huang's early recruits. "Chi didn't try to romanticize his message," Mankey recalls. "He made it clear this was no 'semester abroad' adventure." As a member of one of the first teams to go to La Paz, Mankey helped set up the organization's initial residence for ten street children by integrating behavioral modification principles into its programs. Some of the principles echoed those implemented in residential psychiatric programs for children while others were meant to provide positive parenting guidelines to the orphanage staff who worked with the children.

Those first residential programs were frustrating in the beginning. "So many kids went back to the streets," Huang says. But frustration led to action: The organization began to investigate barriers that kept children from abandoning life on the streets.

Other subjects for research sprang up: What support would a child need before returning to school? When the children became parents, how would they cope with caring for infants and toddlers? Were there best practices available that indicated how to intervene to help at-risk families?

In 2008, supported by a decade of investigating these questions, the growing group of volunteers in La Paz and Boston tuned the scope of the organization's programs. They also formalized the organization's name to Kaya Children International. In the same year, the newly named group opened the Kaya Center in La Paz. The center's activities complement Kaya's street outreach and residential programs by offering in-house tutoring for children about to enter the school system; day programs that include employment training for older youth; individual, group, and family counseling; recreational activities; meals; and crisis support. Currently, 31 children who live in Kaya's residential program, together with another 62 children and 10 mothers, are served by the Kaya Center.

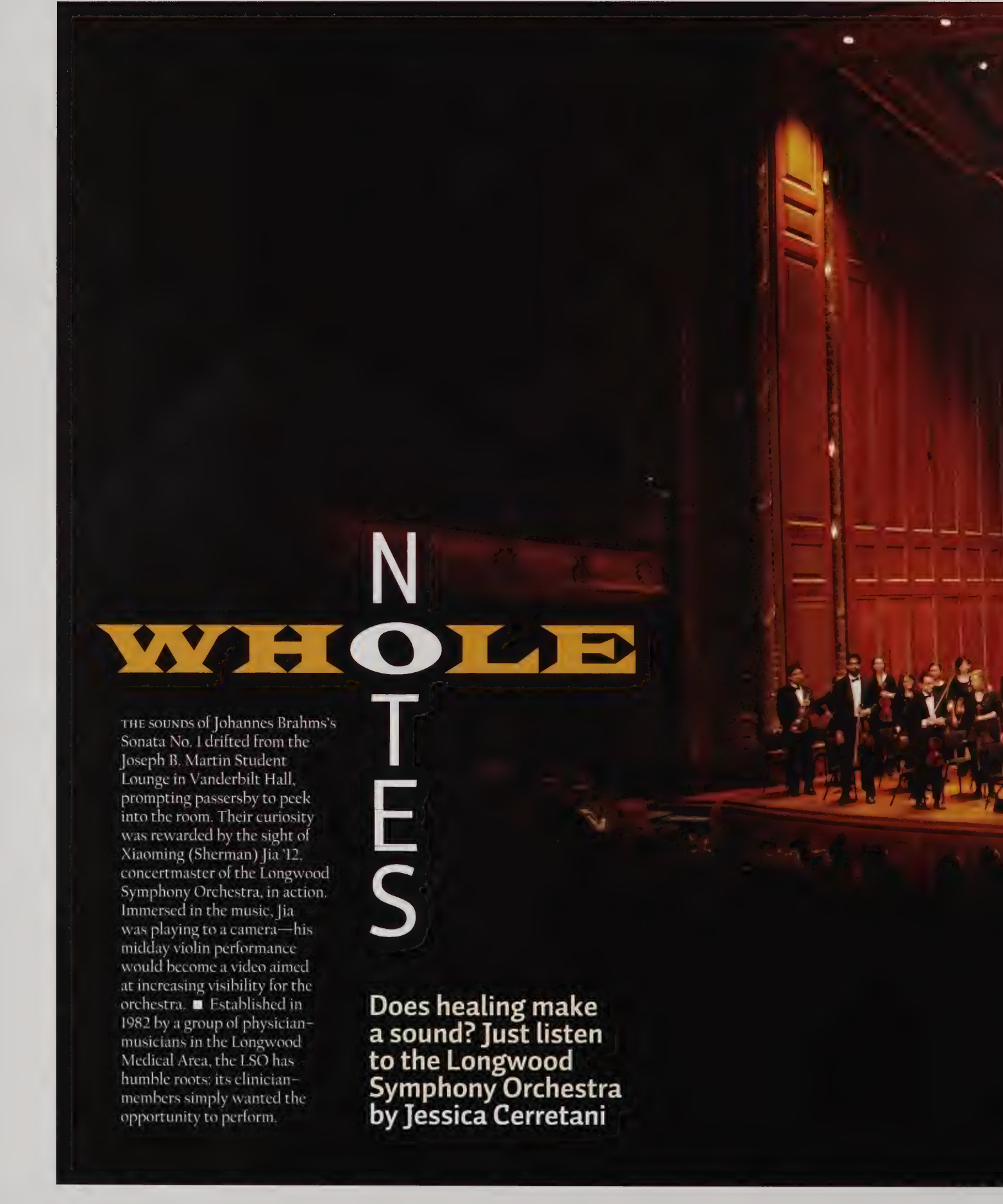
According to the organization's executive director, Sarah Porter, the group works to meet the immediate needs of those living on or near the streets, while also serving as part of a larger effort working toward a future where no child calls the streets home.

Huang says that although he now enjoys the less-demanding role of Dr. Chi, founder, he still cherishes the memories of the children he has met.

"Some of the kids came up with the name 'Kaya Children,'" Huang says. The word *kaya* means *tomorrow* in Quechua, one of the indigenous languages of Bolivia. "That was an encouraging choice. When refugees start to hope for a better tomorrow, they cease to be refugees." ■

*Michael Rafferty is a health and medical writer based in Massachusetts.*





# N WHOLE TES

THE SOUNDS of Johannes Brahms's Sonata No. 1 drifted from the Joseph B. Martin Student Lounge in Vanderbilt Hall, prompting passersby to peek into the room. Their curiosity was rewarded by the sight of Xiaoming (Sherman) Jia '12, concertmaster of the Longwood Symphony Orchestra, in action. Immersed in the music, Jia was playing to a camera—his midday violin performance would become a video aimed at increasing visibility for the orchestra. ■ Established in 1982 by a group of physician-musicians in the Longwood Medical Area, the LSO has humble roots; its clinician-members simply wanted the opportunity to perform.

**Does healing make a sound? Just listen to the Longwood Symphony Orchestra**  
by Jessica Cerretani





**CONCERTED EFFORT:** Performances by the Longwood Symphony Orchestra often benefit a health-related nonprofit organization, a mission central to the LSO's Healing Art of Music program.



**SHIFT WORK:** Stephen Wright is an HMS lecturer in medicine at Brigham and Women's Hospital by day, a bassoonist with the LSO many a night.



The orchestra's past president, Lisa Wong, an HMS clinical instructor in pediatrics at Massachusetts General Hospital and a violinist who has studied her fellow dual-career peers, estimates that about three-quarters of physicians and scientists have had at least one year of instrumental training as children, and many continue to play through medical school and beyond. The LSO itself boasts more than 100 musicians—most with a background in medicine—including a pathologist who plays flute, an infectious disease specialist who plays cello, and an orthopedic surgeon who plays clarinet.

For some physicians, the LSO's existence influenced their choice of medical school. "I decided to pursue my education at HMS in part because I knew of the LSO and of its involvement in the Boston community," says Michael Barnett '11, a second-year resident in internal medicine at Brigham and Women's Hospital and an oboist with a degree from the Yale School of Music. "Playing an instrument has been an important part of my life, and something I plan to continue even during my residency at Brigham and Women's."

The influence music has on medicine and its practice makes sense, says Jia, who began violin lessons at age three. "My years of musical training helped prepare me for the rigors of medical school, and listening to music has helped me better listen to and understand patients." Jia is no doubt putting this training to work; he is undertaking a year in medicine at Beth Israel Deaconess Medical Center and next year will head to the University of California, San Francisco, for a neurology residency.



Indeed, a growing body of research suggests that regularly practicing an instrument can have remarkable effects on the brain, improving motor skills, alertness, hearing, and memory. Even listening to music in the operating room—particularly classical music—has been linked to better performance and lower stress in surgeons.

But for Jia, and other members of the LSO, the music and medicine connection holds another link, that of philanthropy for health-related causes. "Many professional musicians see performance as just a job," Jia notes. "But as a physician, I want to use my musical skills to help others and as a complementary avenue for healing."

#### Tap Root

It's that attitude that led Wong and some of her fellow musicians to develop the orchestra's Healing Art of Music program. Based on what has become one of the LSO's guiding principles—giving back—the program partners with local nonprofits to create fundraising opportunities that showcase the organizations' work, as well as the orchestra's talent.

Although the program was created some 20 years ago, its roots can be traced to the early 1900s and the African village of Lambaréné.

There, the physician and future Nobel Peace Prize laureate, Albert Schweitzer, himself a musician and biographer of Johann Sebastian Bach, founded a hospital, treated patients, and developed his mission to promote a way of being he called a reverence for life. This philosophy has resonated with generations of physicians. It was an honor, therefore, for the members of the LSO when, in 1991, they were invited to join master cellist Yo-Yo Ma for a concert celebrating the Albert Schweitzer Fellowship's new community-service program.

"It was the finale of a Boston-wide symposium aimed at discussing four issues Dr. Schweitzer might address if he was still practicing today," explains Wong. "HIV and AIDS, homelessness, children's health, and domestic violence. The concert was a chance to bring physicians together with nonprofit agencies and their clients. We were thrilled."

The excitement of performing helps fuel many medical-musical ensembles. From Texas to New York, U.S. physicians, dentists, nurses, and researchers are joining orchestras composed principally of medical professionals. These groups range in size, from duos to the 500-member World Doctors Orchestra, a five-year-old group based in Germany, that draws its members from some 30 countries.



Most such ensembles donate at least a portion of their ticket-sales revenue to charity. The LSO's philanthropic model, however, remains unique, forged as it was by the outcome of that Schweitzer Fellowship concert two decades ago. Despite careful planning, the concert's organizers hadn't anticipated some of the obstacles the fledgling philanthropy would confront. Looking out at the audience the night of the concert, the musicians noticed large pockets of empty seats. Some of these areas represented seats offered to survivors of domestic violence who, concerned for their safety at such a public event, hadn't shown up. Members of Boston's homeless community also were absent: The event was scheduled to end after the 10 p.m. curfew of most city shelters.

Inspired by these revelations, the musicians found a new sense of joy that night, one that allowed them to play with more passion than usual. "We were playing for something beyond ourselves, and that realization was transformative," says Wong. "But we understood that, although we were on the right track, we needed to create events that really resonated with the people we were entertaining."

The LSO's members decided to tailor each of their concerts for a different underserved population. Although this decision was easy, putting it into action proved a bit more difficult. At first, the members considered simply donating blocks of tickets to nonprofit organizations. But, Wong explains, "When you give something away, the recipient might consider it to be of a lesser value." Instead, the nonprofit is asked to collaborate with the LSO by purchasing a block of tickets, so that together, the two groups can raise

**The LSO itself boasts more than 100 musicians—most with a background in medicine—including a pathologist who plays flute, an infectious disease specialist who plays cello, and an orthopedic surgeon who plays clarinet.**

awareness about public health causes, a practice that continues today.

Yet the goal of the Healing Art of Music program is not merely to provide nonprofits and their clients with an evening of entertainment. Again, tapping the lesson from the Schweitzer concert, Wong and her fellow musicians realized that, to truly touch their audiences, they had to get to know them.

The members decided to focus on just a few organizations each season, learning all they could about the groups' missions, and working with them to create concerts and other fundraising events tailored to those missions. With that, the Healing Art of Music's community partnerships were born.

#### Airs Jordan

One such community partnership had started incubating six years before the Schweitzer event, when Wong met James O'Connell '82, who had helped found the Boston Health Care for the Homeless Program. O'Connell, an HMS assistant professor of medicine at Mass General, recalls, "We were both really taken by what was happening in Boston at the time in terms of tackling community health challenges."

The friendship persisted. So when Boston Health Care for the Homeless needed to raise money for what is now the Barbara McInnis House, a medical respite-care facility, the organization teamed up with the LSO to plan the ultimate fundraising event: a concert for the homeless community, the nonprofit's staff, and donors, at the New England Conservatory's Jordan Hall. Inside that elegant wood-paneled venue, the musicians delivered a powerful performance,

delighting the audience with a selection of classical pieces, including Vuk Kulenovic's *Wave*, Antonín Dvořák's Cello Concerto, and Richard Strauss's *Death and Transfiguration*. The effects of the performance continued long after the standing ovation.

"Lisa and the LSO were instrumental in introducing us to the world of philanthropy," says O'Connell. "The concert was a fabulous event—and very successful." The LSO and Boston Health Care for the Homeless have repeated their collaboration twice, most recently in 2011, with each effort contributing to the growth of service and support for Boston's homeless community.

#### Group Dynamics

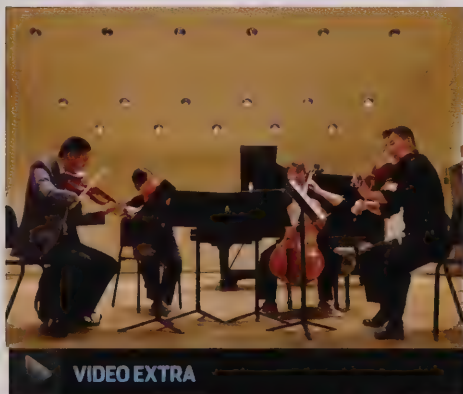
The LSO's Healing Art of Music program has grown, too. Now in its second decade, it has fine-tuned its approach to fundraising and choosing organizations to help.

"We tend to partner with nonprofits that focus on health, social justice, or community building, ones that might not be able to put on a large event on their own," says Barnett, who has been the chair of the LSO's Community Engagement Committee for the past several years.

The orchestra has teamed with 37 nonprofits, ranging from Artists for Alzheimer's to Children of Chernobyl, often for multiple events. In January 2010, the LSO joined with Partners In Health to raise money in response to the earthquake in Haiti. This November, the LSO celebrates the opening of a new rehabilitation hospital in that country, made possible in part through donations the orchestra generated, with a follow-up concert that features Haitian musicians playing with the orchestra.

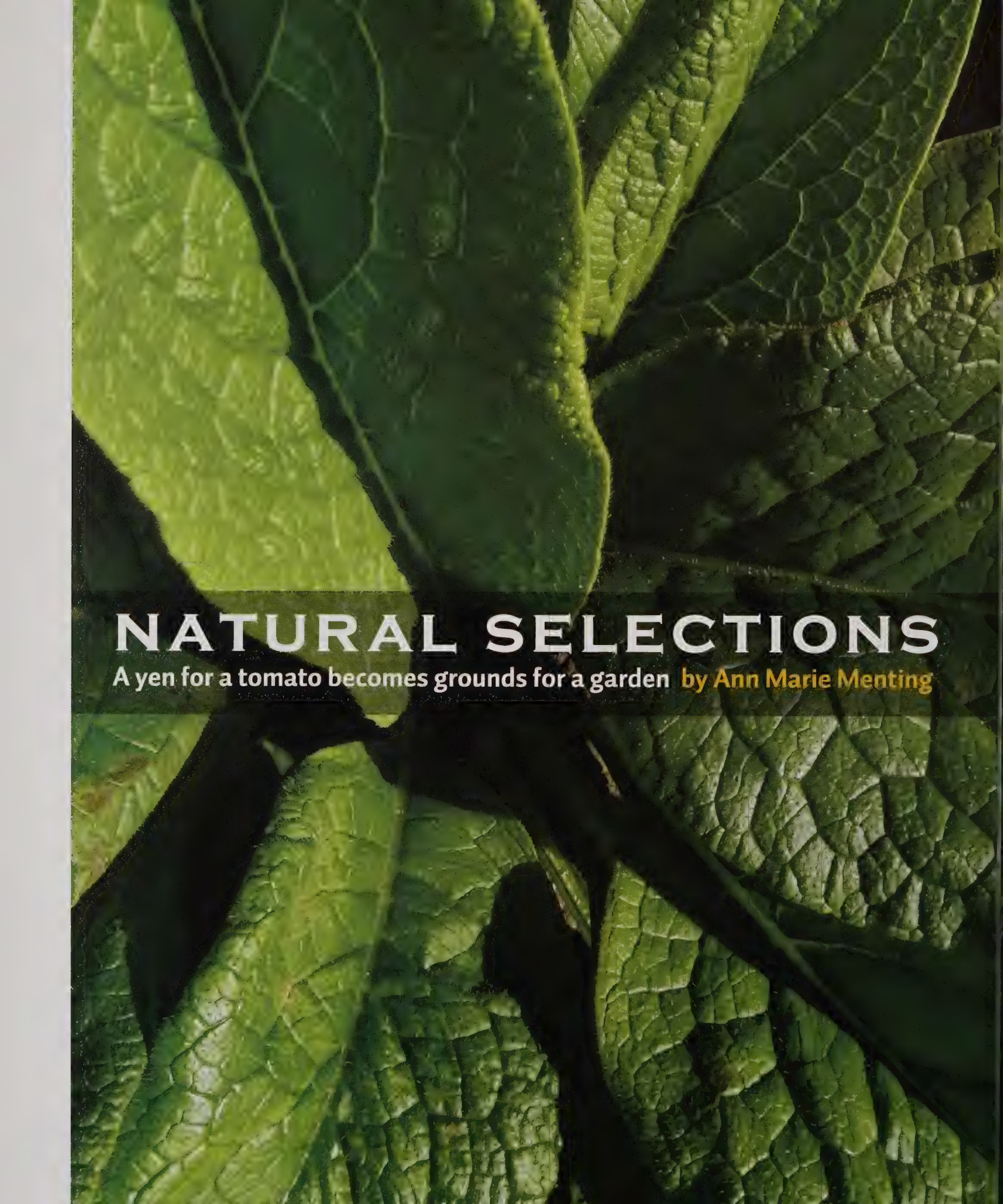
As the LSO opens its thirtieth season, change is in the air. A new music director has been appointed, and the future of the LSO's dual mission looks strong. Says Barnett, "We're always exploring how we can have an even longer reach and an even better recipe for success." And while some shifts are bittersweet—such as the move by Wong to step down as the LSO's president—the orchestra's mission remains strong. "The fusion of music and medicine is quickly becoming part of a national conversation," Wong says. "It's an exciting time for the LSO." ■

*Jessica Cerretani is a health and medical writer based in Boston.*



**Musical Scripts:** A conversation with Sherman Jia  
hms.harvard.edu/harvard-medicine

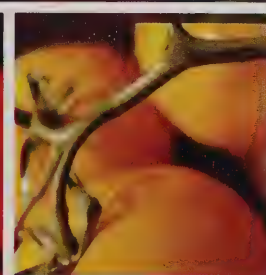


A close-up photograph of several green leaves, likely from a tomato plant, showing prominent veins and a slightly textured surface. The leaves are arranged in a way that creates a sense of depth and texture, with some leaves in sharp focus and others slightly blurred in the background.

# NATURAL SELECTIONS

A yen for a tomato becomes grounds for a garden **by Ann Marie Menting**





**RECENT ACQUISITIONS:**  
Among the plants growing in Countway's pocket garden are medicinal herbs such as (clockwise, from below) rosemary, comfrey, and echinacea.



JAKE MILLER: AKAPLUMMER/ISTOCKPHOTO.COM (TOMATOES)

IN A RECTANGLE OF CEMENT tucked between the Francis A. Countway Library of Medicine and Huntington Avenue, a garden grows. Begun with a wish for vine-ripened tomatoes uttered by some of the Countway librarians during one of their "salad club" lunches, the garden now produces tomatoes, basil, chard, and other green-meal ingredients. But in keeping with the day jobs of the librarians and others who tend the patch, the garden is also advancing education and research by showcasing some of the herbs and flowers that have been used as medicines in the twentieth century.

"While we see the medicinal herb garden as a tool in the education of medical students, pharmacy students, and the public," says Julia Whelan, a reference and education services librarian at the Countway and a natural medicines expert, "we also hope it will facilitate research into the role that natural pharmaceuticals have in the clinic today." Whelan, Giordana Mecagni, an acquisitions archivist in the library's Center for the History of Medicine, and Jessica Sedgwick, a project archivist for the Archives for Women in Medicine, helped author the garden proposal and, together with Wendy Brown, who oversees the garden's care while also serving as the library's access and reference assistant, are among the handful of library employees who have shepherded its development over the past four years.

According to Whelan, 20 to 60 percent of the U.S. population uses herbal dietary supplements on a regular basis, yet our knowledge of the effects of these supplements on human physiology remains limited. Physicians sometimes fail to ask about supplement use when taking patient histories. Even when doctors do ask, patients, concerned that such self-medication will be frowned upon, may downplay their use of herbals or omit mentioning them altogether.

There can be consequences to such omissions. The effectiveness and safety of medications given to patients who receive transplants can be compromised if those drugs are taken with certain herbals. Likewise, some of these medicines can interfere with the activity of prescription medications: garlic and vitamin E supplements can increase the action of anticoagulants, while St. John's wort interacts with many medications including contraceptives; cyclosporine, an immune-system suppressant; digoxin; and antidepressants such as Paxil and Zoloft.

To spread knowledge of the physiological and medicinal effects of plants to those professionals who could directly benefit from it, the garden's keepers are collaborating with educators at the Massachusetts College of Pharmacy and Health Sciences to bring information on herbal products to their students. To disseminate information on the power of plant-based supplements, Whelan and Brown have teamed up with Lana Dvorkin Camiel, a professor at the Mass College of Pharmacy, to produce podcasts on some of the medicinal herbs in the garden. Dvorkin Camiel also directs the college's applied natural products programs and has been instrumental in helping the librarians design the Countway garden.

Finding space for this garden spot on the tightly packed Longwood campus was a challenge, but one overcome when the librarian-gardeners took a new look at something they saw every day. If their plans to bring to light the role of herbal pharmaceuticals go as hoped, the same might one day be said of a plant in a garden near you. ■

#### PHOTO GALLERY

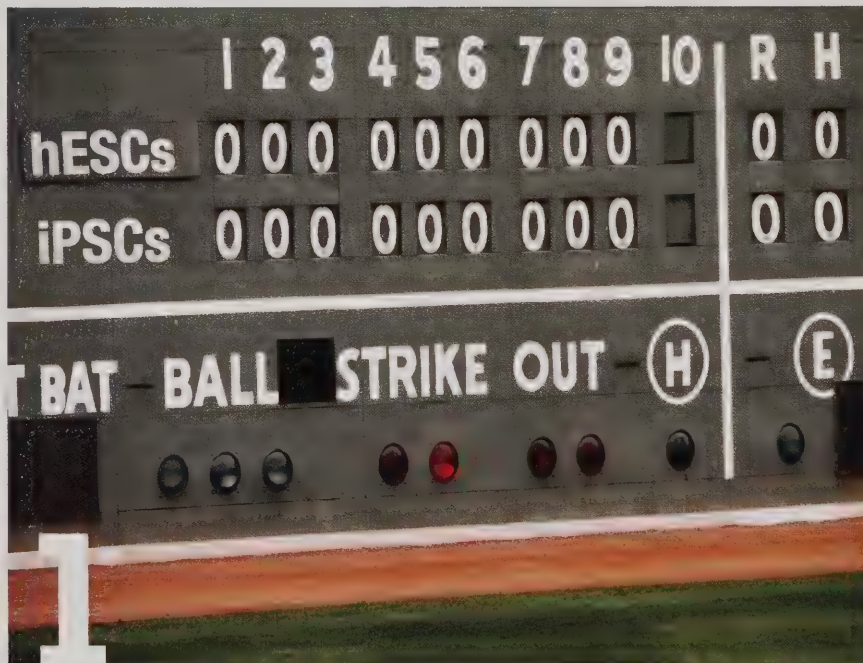
The garden at the Francis A. Countway Library of Medicine  
[hms.harvard.edu/harvard-medicine](https://hms.harvard.edu/harvard-medicine)

*Ann Marie Menting is editor of Harvard Medicine magazine.*



## Cellular Reboot: Healing with Stem Cells

by Shraddha Chakradhar



# 2

### See Change

WHEN EYE DISEASE strikes, our view of the world can become fogged. Fortunately, work by HMS scientists may point to a way to regain diminished, even lost, vision.

Using a mouse model, researchers at the Schepens Eye Research Institute created induced pluripotent stem cells (iPSCs) from skin cells, then used those stem cells to regenerate areas of the retina that hold photoreceptor cells known as rods and cones. Regeneration was followed by recovery, as the scientists also observed an overall improvement in visual function.

For the study, a team of researchers led by Michael Young, an HMS associate professor of ophthalmology at Schepens, nudged the iPSCs to become immature retinal cells and marked the cells with a fluorescent protein before introducing them into diseased mice. The fluorescence allowed the scientists to monitor the location and function of the introduced cells. As the cells matured, the researchers stimulated the retina with light. Over time, the team detected electrical activity in the new retinal cells and tissue; nonfunctional areas were now functioning at 50 percent of the level found in a nondiseased, fully functioning retina. The study is the first to report this level of function in retinal cells regenerated from iPSCs.

The results may hint at treatments for diseases such as retinitis pigmentosa, diabetic retinopathy, and age-related macular degeneration.

### Keeping Stats

AS SPORTS ENTHUSIASTS KNOW, keeping score is crucial to understanding any game. It turns out that keeping score is also helpful to scientists who work with stem cells—knowing the “score” of the cell line they are working with can indicate much about the research they conduct and the results they can expect.

Researchers at the Harvard Stem Cell Institute (HSCI) have collaborated with the Broad Institute of Harvard and MIT to create a “scorecard” to compare how stem cell lines match up against each other. The tool provides a quick, accurate way to test a stem cell’s pluripotency; that is, its ability to be reprogrammed to become a different cell type. The team at HSCI, led by Alexander Meissner, an assistant professor of stem cell and regenerative biology at Harvard University, conducted a genomic analysis of 20 frequently used human embryonic stem cell lines (hESCs), the gold standard in stem cells, and created reference maps of them. Working with Kevin Eggan, a professor in the School’s Department of Stem Cell and Regenerative Biology and in the Harvard Department of Stem Cell and Regenerative Biology, the researchers then compared 20 hESC lines with 12 induced pluripotent stem cell (iPSC) lines. The comparison showed that the iPSC lines exhibited a pattern of variation similar to that of the reference hESCs in Meissner’s map.

The researchers compared how well each of the two cell types grew into motor neurons and found that, with some coaxing, the iPSCs were just as successful as the hESCs. The researchers suggest that this assessment tool may allow for more effective ways to use stem cells to study disease development and therapy.





# 3

## Getting the Nerve

WHEN IT COMES TO CELLULAR REGENERATION, nerve cells, especially those in the brain, present a singular challenge. So it's significant news that HMS researchers at Boston Children's Hospital have managed to not only regrow some optic-nerve fibers, but also to re-establish some level of vision in mice with severe optic-nerve damage. The study, by a team led by Larry Benowitz, an HMS professor of surgery and director of Laboratories for Neuroscience Research in Neurosurgery at Children's, is the first of its kind to show that regenerated fibers can regrow to span the distance from eye to brain, can connect with the brain's visual centers and form synapses with other neurons involved

in deciphering visual impulses, and can become wrapped in myelin, the material that helps speed the transmission of nerve impulses.

Building on several years of research, the team used a three-pronged approach to regrow axons arising from retinal ganglion cells. The stepwise approach required the scientists to first stimulate the ganglion cells with oncomodulin, a growth-promoting compound discovered in Benowitz's lab, that is secreted by cells of the innate immune system, and then to elevate the level of the signaling molecule cyclic adenosine monophosphate. For the third step, the team deleted the gene that encodes a certain cell growth-inhibiting enzyme. When these three interventions

were applied to mice with damaged optic nerves, nerve fibers regrew the full length of the optic nerve and then to the brain, forming synaptic connections in appropriate visual processing centers.

The team also observed that this regeneration led to improvements in visual function; specifically, improved depth and movement detection and an increased awareness of light and dark. However, the actual vision regained by the mice was limited, and their ability to distinguish objects remained impaired. The results of this study not only show that the mature visual pathway has a greater degree of regenerative potential than anticipated, they also hold promise for people suffering from optic-nerve damage resulting from trauma or glaucoma.



## Fresh Breath

IN AN ONGOING EFFORT to address ways of understanding the mechanisms underlying devastating lung diseases such as cystic fibrosis, researchers at Massachusetts General Hospital have developed a stepwise method for generating disease-specific lung progenitor cells and airway epithelial tissue starting with skin cells from patients with cystic fibrosis. These cells can provide a platform for screening potential therapeutic compounds for humans and for studying lung disease.

The team, led by Jayaraj Rajagopal '94, an HMS assistant professor of medicine at Mass General and a faculty member at the Harvard Stem Cell Research Institute, refined the serial method in a mouse model, beginning with murine pluripotent stem cells that were then converted to lung progenitor cells in a manner that mimicked how embryonic cells are converted into lung cells in an embryo. When placed subcutaneously in mice, the progenitor cells formed airway epithelium. The scientists then applied the technique to human cells by creating induced pluripotent stem cells (iPSCs) from skin cells taken from patients with cystic fibrosis. Among the iPSCs created, one was generated from a patient who carried two mutations known to cause cystic fibrosis; each of the mutations has been a target for therapeutics. When these disease-specific lung progenitor cells were grafted into an immunodeficient mouse model and allowed to replicate, they developed into human airway epithelium.

The researchers hope to use the stem cell-generated lung epithelial tissue to study cystic fibrosis further and to screen drugs to find ones that work best for individual patients. In addition, the technique can be used to study and screen therapeutics for other diseases that affect the lung's epithelium, including asthma, lung cancer, and chronic bronchitis.



# BACKSTORY

FROM THE COLLECTIONS AT HARVARD MEDICAL SCHOOL

**Physicians in battle** zones have always had to make do with difficult working conditions to treat wounds, often achieving stunning results, and sometimes making long-lasting contributions to medical knowledge.

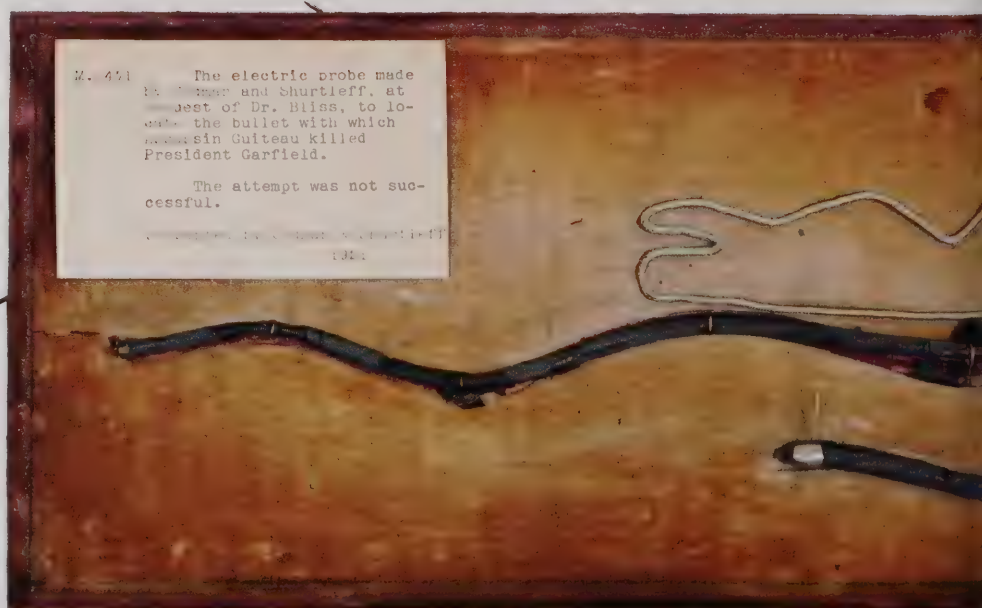
The challenging conditions of this nation's Civil War, for example, yielded several now-standard medical procedures. Notorious for poor supply chains, a dearth of trained medical personnel, and massive casualties, this war nevertheless produced the foundations of a triage system for trauma care, the routine use of anesthetics, the beginnings of the use of sanitary practices such as handwashing, and the discovery that shock was a condition that needed specialized treatment.

During World War I, necessity again propelled innovation, as the severity of injuries kept pace with modern weaponry. Triage evolved to favor first treating patients with critical but less complicated wounds over those with the most severe injuries. Other advances included the use of splints to immobilize fractured femurs and the use of ligature to help stanch bleeding from gunshot wounds. While no one would say that war provides an ideal classroom, physicians, in their quest to save lives and limbs, have used it to learn how to care for the wounded in new, and lasting, ways.

—Susan Karcz



18



M. 451 The electric probe made by Palmer and Shurtleff, at request of Dr. Bliss, to locate the bullet with which James A. Garfield was killed.

The attempt was not successful.

PAUL MORRISON





**MUTE TESTIMONY:** Objects associated with injuries acquired in violent acts include, clockwise, from left, a femur with a bullet lodged in the diaphysis (willed to the Boston Society of Natural History by Jeffries Wyman, Class of 1837); a set of three facial moulages, made during World War I by Varaztad Kazanjian, Class of 1921, showing the progress of reconstruction and recovery of a British soldier who lost his mandible in an explosion; a probe used, unsuccessfully, to locate the bullet lodged in President Garfield's body following the assassination attempt in 1881; and a skull fragment from a Civil War veteran, with bullet embedded.

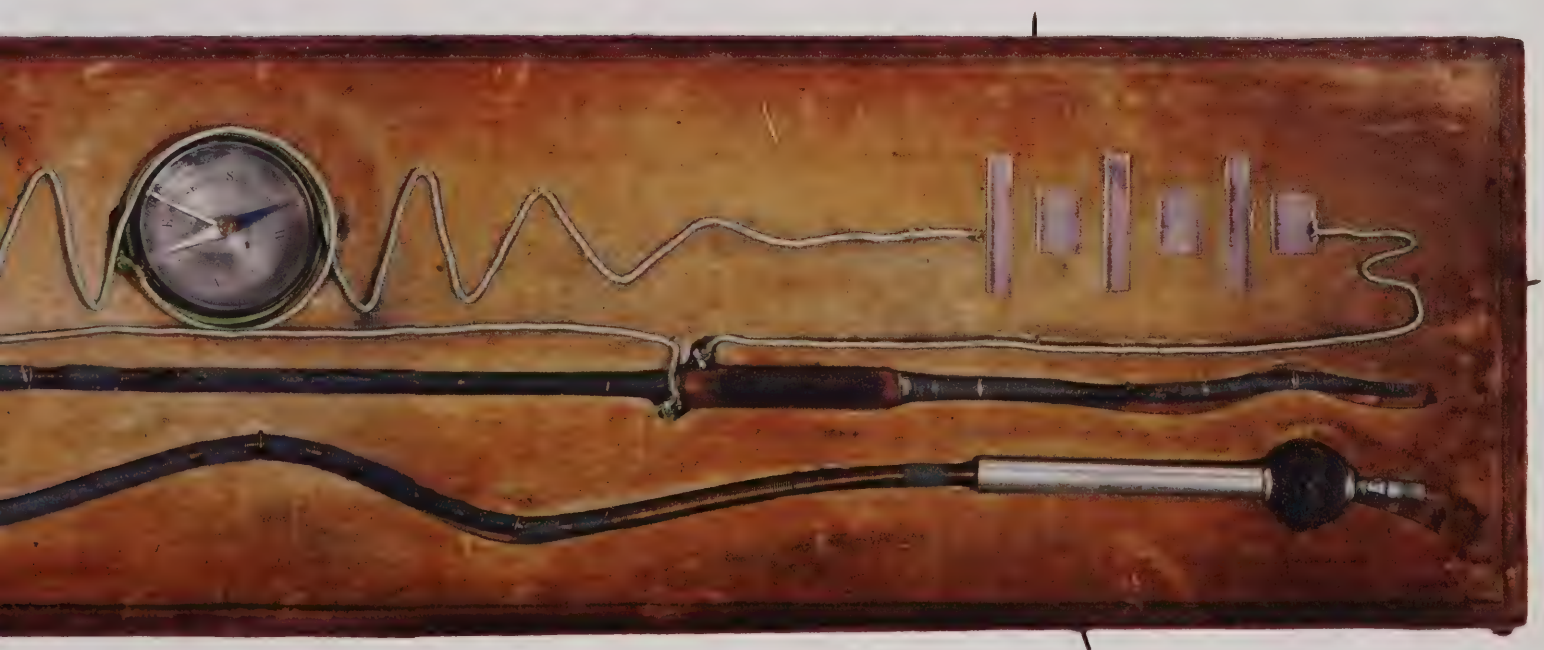


18



18<sup>c</sup>

*Facial moulages courtesy of the Harvard Medical Library at the Francis A. Countway Library of Medicine. Other items courtesy of the Warren Anatomical Museum at the Francis A. Countway Library of Medicine.*





# FIVE QUESTIONS

FOR SUMNER SLAVIN



## What led you to become a plastic surgeon?

When I saw plastic surgery performed, it was love at first sight. It had an aura of excitement and creativity that really appealed to me. It's psychosocial surgery to a large degree, but it's also surgery that adheres to the classic principles of medicine and physiology, including those relating to wound healing, the handling of tissues, and wound closure.

## How would you describe the role of a plastic surgeon?

We are the quality-of-life people who try to restore the patient to the closest sense of normality possible under the circumstances. That may mean restoring a body part to a more usual appearance or that may mean healing wounds. With every problem, you initially want to close wounds and fill in tissue, but, in the end, you know the patient also wants everything to look as good as possible. I always say our work starts out reconstructive and ends aesthetic.

## How do you learn what "looking as good as possible" means to each of your patients?

Plastic surgery is a very personal field. People discuss fears, inadequacies, and issues of body image with their surgeon, topics that may be even more personal than those discussed when talking about illness in general. So we generally have short but very intense interactions with our patients. You really have a chance to see the most important sides of a human. It's vital to the profession that its practitioners have sensitivity and enjoy the warmth of doctor-patient relationships rather than shun them.

## Associate Clinical Professor of Surgery, Harvard Medical School, Beth Israel Deaconess Medical Center

Former Chief, Division of Plastic Surgery, BIDMC; Codirector, Lymphedema Program, Boston Children's Hospital; Codirector, Anesthetic Surgery Fellowship, BIDMC.

## You've specialized in treating breast-cancer patients. How did you choose this specialty?

My choice was influenced by a patient I met at the Dana-Farber Cancer Institute during my first year of practice. I had been doing hand surgery and my chief of surgery asked if I would see a patient in the breast-cancer clinic who had received cobalt radiation after mastectomy. The treatment had created a painful open chest wound that could never have healed on its own. I performed a new procedure on her, and it was a success. From that day, I stopped performing hand surgery and concentrated on breast reconstruction. I haven't looked back.

## How has plastic surgery for breast-cancer patients changed during your career?

Lower morbidity and fewer complications are associated with the new reconstructions. The patient now has good quality of life from an event that 20 years ago would have been devastating and 30 or 40 years ago would have been devastating and mutilating. As a trainee in 1973, I saw extreme radical mastectomies. This year, I moderated a panel on techniques that leave all tissues intact. That's an extraordinary leap, a quantum leap, in technique improvement.

—Charli Kerns

## PODCAST

Psychosocial Healing: A plastic surgeon finds new ways to soothe physical and emotional wounds  
[hms.harvard.edu/harvard-medicine](http://hms.harvard.edu/harvard-medicine)



# CONNECT THE DOCS

THE COMMUNITY OF HARVARD MEDICAL SCHOOL ALUMNI

## President's Report



The HMS Alumni Council's first meeting of the 2012–13 academic year was a lively one,

packed with information on the School. It also was a welcome to five newly elected members: Barbara McNeil '66, president-elect; L.D. Britt '77, treasurer; and Eleanor Shore '55, Mary Mullen '87, and Stephen Martin '01, councilors.

During the past two years, members of the Council have watched the emergence of the HMS Center for Primary Care with great interest. The Center aims both to fill a gap in HMS students' exposure to primary care careers and to bring more attention at HMS to the central role that primary care plays in any well-functioning, socially responsible, high-value health care delivery system. As a primary care physician and HMS faculty member myself, the new Center is an exciting and welcome initiative. The Alumni Council has previously expressed its support of the Center to Dean Flier and will continue to monitor the Center's progress as its programs develop in the coming year.

*Nancy Rigotti '78 is an HMS professor of medicine at Massachusetts General Hospital.*



CONTINUING ED:  
A.W. Karchmer, chair of  
HMS Alumni Relations,  
opened Alumni Week's  
faculty symposium.

## PIECE WORK

*Faculty researchers puzzle out disease triggers*

**f**aculty scientists described their investigations into the causes of some of today's more intractable diseases during an Alumni Week symposium in May. From Alzheimer's disease, to type 2 diabetes, to metabolic and inflammatory illnesses, the presenters described findings they hope will not only form a picture of the causes of disease but also a map for treatment and prevention.

Dennis Selkoe captured the audience's attention with his team's discovery, from studies of presenilin, notch, and amyloid precursor proteins (APPs), that neurodegenerative diseases such as Alzheimer's may be related to aspects of normal development. Presenilin activates notch,

which directs the expression of genes that determine a cell's role in development in nearly all organs, and also triggers the release of amyloid beta proteins by APP. Amyloid beta proteins can accumulate to form senile plaques in areas of the brain important to cognition and memory, leading to Alzheimer's. Inhibiting presenilin blocks APP's action, but it can also block the necessary function of notch in adults. Selkoe, the Vincent and Stella Coates Professor of Neurologic Diseases at HMS and codirector of the Center for Neurologic Diseases at Brigham and Women's Hospital, encapsulated the dilemma: "The biological function by which we gain Alzheimer's is actually necessary for life."

Developing type 2 diabetes, said David Altshuler '90, involves complex changes in DNA. Altshuler, HMS professor of genetics and medicine at Massachusetts General Hospital and deputy director of the program in medicine and population genetics at the Broad Institute of Harvard and MIT, explained that diseases like type 2 diabetes cannot be linked to a single gene mutation. He pointed to studies uncovering 50 new regions of the genome that have variations linked with the risk of diabetes.

Influences of intracellular genetic interactions on disease were addressed by Vamsi Mootha '98, an HMS professor of systems biology at Mass General. Mitochondria function through the activity of proteins produced by both their genomes and the cell's genome. Inherited mitochondrial disorders arise from mutations within either genome. To understand the molecular basis of these diseases, Mootha's team has systematically identified the nearly 1,100 mitochondrial proteins. Mootha hopes to develop predictive models of mitochondrial physiology to help diagnose and treat many human diseases.

Treatment was also a key goal of work by Malcolm Whitman, a professor of developmental biology at the Harvard School of Dental Medicine. His research team found that halofuginone, a derivative of an active agent in the Chinese herb *chang shan*, inhibits the differentiation of a T-cell subtype involved in many autoimmune diseases, including multiple sclerosis and rheumatoid arthritis. The group is now identifying other diseases for which halofuginone may be a treatment.

—Charli Kerns



# CLASS NOTES

NEWS FROM ALUMNI

## 1945

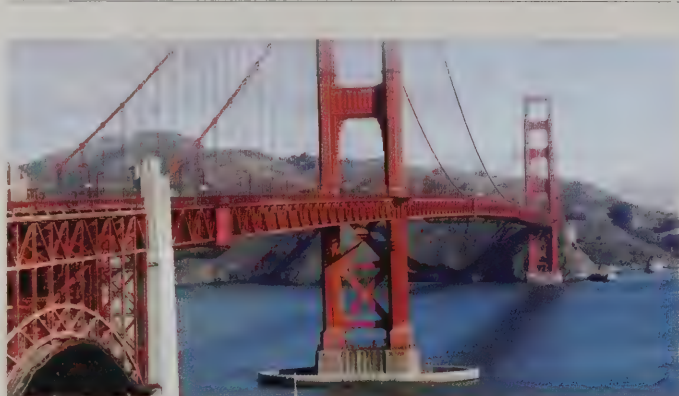
### Giulio D'Angio

My son Peter has left St. Luke's Church in Scranton, Pennsylvania, to become the rector of Trinity Church in Covington, Kentucky. My granddaughter Sara graduated from the Virginia Theological Seminary in May, where her husband is an alumnus. My great-niece is at Duke preparing for a career as a hospital chaplain, thus joining her father in the ministry. My wife, Audrey Evans, is occupied with setting up a church school for the underprivileged in North Philadelphia. I am an island in a sea of ecclesiastics.

## 1947

### Charles Lasley

After 60 years in the operating room doing cardiothoracic surgery, I'm back to watercolor painting. I had a surprise 90th birthday party, but can still run 5 miles (slower).



### WEST TOAST

The Harvard Medical Alumni Association will host a reception Sunday, November 4, at the Association of American Medical Colleges' annual meeting, which will be held in San Francisco. HMS alumni who wish to attend should contact Meredith Tremblay at 617.384.8520 or email HMAA at hmsalum@hms.harvard.edu.

## 1948

### David Chamovitz

I assume that committee membership contributes to longevity. At least you have my thanks for 63 years of work. Let's aim for 20 more. No promises, but haven't missed a reunion so far.

## 1949

### Thomas Hall

I've been trying to puzzle out the relative roles of cooperation and other behaviors in a retired researcher. So, I've registered to finish the degree in humanities that was interrupted by World War II.

### Francis Riley

After my dear wife, Marion, died in March 2011, on Martha's Vineyard, I moved with my dog, Izzie, into a "luxury retirement community" in Scottsdale, Arizona, where I live a very different life.

## 1952

### Buel Grow

Best wishes to my classmates of '52. Anne and I are still relatively well. We're trying to sell our house to move to a retirement community.

### Joel Huneycutt

I've been retired since 1990 but am still working at golf and tennis.

## 1954

### Richard Cattell

My wife, Judy, and I moved from Canada to Manhattan, Kansas, last year to be near our son. We are past our backcountry and boating days, but have an attractive duplex with a beautiful guest bedroom looking to the eastern horizon of tall-grass prairie. Come visit us on I-70.

### Donald Clark

I've been retired 16 years. Golfing, gardening, going to meetings, and enjoying the arts. HMS did not teach me how to make money as a rural internist, but how to care for patients. I remember this daily.

## 1955

### Robert Brooks

Enjoying living in our retirement community. Enjoy talking with Ben Whitehill and Pete H'Doubler from time to time.

## 1957

### Wilbert Aronow

I received the Distinguished Fellowship Award from the International Academy of Cardiology at the 17th World Congress on Heart Disease in Toronto, in July.

### Francis Rockett

Lots of changes in the past five years in practice, in family (14 grandchildren), and in contributing to the advancement of teaching in surgery—as a patient. But our marriage of 54 years continues to improve with age.

### Howard Rubenstein

My book, *The Good Friday Prayer*, was published this year by Granite Hills Press. Every Good Friday, the Catholic Church says a prayer for the conversion of the Jews. This book is an answer to that prayer.

## 1959

### S. Bert Litwin

My latest book, *Color Atlas of Congenital Heart Surgery*, 2nd edition, was recently translated into Chinese and published in Beijing.

## 1960

### Mark Perloth

I see Rex Jamison regularly at grand rounds and exchange emails with Bob Replogle regarding the end of American civilization as we know it; with Abba Kastin on U.S.-Israeli relations, and with Dick Wurtman on bodybuilding. I keep busy consulting, traveling, watching the kids step into their professional lives, and skiing with grandkids. Grateful to still be healthy. Regards to all.





## 1963 50th REUNION

### Dale Cowan

After retiring from full-time practice two years ago, I was asked by Parma Community General Hospital to work part time as vice president of medical affairs. I accepted and thereby flunked retirement.

## 1964

### Florence Irvine

In April we left our rural property in Lake County, California, and moved to a retirement community in Santa Rosa, north of San Francisco, where our son's family lives.

### Jay Jackman

After turning 73 and experiencing the untimely deaths and illnesses of too many family and friends, I decided to retire. I plan to spend my time writing, keeping well and fit, and hanging out with children, grandchildren, and my soul mate, Myra.

## 1968 45th REUNION

### Sarah Donaldson

I continue to work full time at Stanford, as professor of radiation oncology. In November 2011, I became president of the Radiological Society of North America.

### Peter Zawadsky, Jr.

I continue to work at the Uniformed Services University of

the Health Sciences in Bethesda, Maryland, as pediatric site director. In addition to other academic duties, I teach third-year medical students in the outpatient clinic at the Walter Reed National Military Medical Center.

## 1970

### Alvin Rosenfeld

I am delighted that my daughter, Lisa, has entered HMS as part of the Class of 2016. She completed studies at the University of Washington and has published her first paper, on malaria death rates, in *The Lancet*.

## 1973 40th REUNION

### Richard Peinert

Still flailing away in private practice. Old man with young kids and double tuitions—I am thinking of starting my own alumni fund! Taking care of patients is still very fulfilling, but I am amazed at the number of decisions on the future of American medicine that are being made by “noncombatants.”

## 1974

### Thomas Najarian

My weight-loss intervention, Qsymia, has received FDA approval, and will be marketed by Vivus, Inc., Mountain View, California.

## 1975

### Patricia Gerbarg

My husband, Richard Brown, and I continue to develop mind-body programs for post-disaster relief in the U.S. and Africa. Our 2012 books are *Non-Drug Treatments for ADHD* and the *Healing Power of the Breath*. Our son David starts his PhD program in education policy at Harvard this fall.

### Kathryn Zufall

I am still enjoying part-time general internal medicine and lots of chamber music with friends. We perform in some museums in downtown Seattle. My parents' clinic, now named the Zufall Health Center, in New Jersey, has become very successful in the years since Robert '47 and Kathryn Zufall opened it in 1990.



The 2012 meeting of the Society of the Silver Stethoscope brought together the following alumni: (front row, left to right) Sheldon Levin '50, Dan Shields '50, Kenneth Walker '50, Don Gair '50, Mort Lorber '52, Don Oken '49, Victor Marcial '49, Doug Crook '49, and Paul Dale '47, as well as (back row, left to right) Dolores Levin, Marlie Shields, John Stoeckle '47, Joyce Gair, Jan Lasley, Charles Lasley '47, Linda Oken, Lorraine Christensen Crook, and John Freymann '46.



## 1978 35th REUNION

### Roger Pasinski

Went down to Atlanta to hike with George Record and John Douglas.

## 1979

### Andre Churchwell

I'm currently associate professor of medicine and biomedical engineering and associate dean of diversity at Vanderbilt School of Medicine.

## 1983 30th REUNION

### David Keller

Moving from clinical practice to policy implementation by working with Rhode Island and Massachusetts state governments on medical home transformation and payment reform. My family is well, kids are grown and employed, so it seemed time to develop a new career. Highly recommended to all!

## 1992

### Gregory Juarez

Happy 20th reunion to the class of 1992!

## GOING OVER SIXTY

Alumni Association introduces "emeritus" reunion category

In May, the Harvard Medical Alumni Association welcomed a new celebrant group to the traditional reunion class gatherings. The Society of the Silver Stethoscope, a group made up of HMS and HSDM alumni who have marked 60 years or more since their graduation, had its first meeting this past spring, drawing 28 HMS alumni and guests. The inaugural meeting saw members of the Society attend the Reunion Gala at the Boston Harbor Hotel as well as the various seminars and presentations that fill Alumni Week's schedule each year.

The Society was created for those alumni who want to stay connected to their peers throughout their golden, or, perhaps we should say, silver, years. In keeping with its name, members receive a small silver stethoscope that can be worn as a lapel pin as well as an invitation to return each year to celebrate and reminisce about their years at HMS.

## 1994

### Andrew Hecht

I have been appointed to the National Football League's Brain and Spine Injury Committee.

## 1997

### Joel Gelfand

I was recently promoted to associate professor of dermatology and epidemiology with tenure at the University of Pennsylvania's Perelman School of Medicine. I also received a \$3.8 million dollar grant from the NIH/NHLBI to conduct a clinical trial evaluating

the impact of psoriasis treatment on vascular inflammation and lipid metabolism. Chiara is a pediatric psychologist in private practice and our daughter, Jadyn, is a happy first grader.

### Kelly Marie Sullivan

Living with my husband, Justin Cashman, an orthopedist, and three children ages 3, 7, and 10, in Annapolis, Maryland. I am medical director of Plastic and Reconstructive Surgery of Annapolis, courtesy faculty at Johns Hopkins Hospital, and founder and chair of the board of the Wellness House of Annapolis. Would love to see classmates if anyone is in the area.

## 1999

### Dan Barouch

I have been named director of the Center for Virology and Vaccine Research in the Department of Medicine at Beth Israel Deaconess Medical Center, Boston.

To submit a class note, please send an email to: [classnotes@hms.harvard.edu](mailto:classnotes@hms.harvard.edu), or write to Harvard Medicine, 107 Avenue Louis Pasteur, Suite 111, Boston, MA 02115.



# OBITUARIES

REMEMBERING DISTINGUISHED LIVES

## 1937

### Paul Floyd

Died on January 26, 2012, at the age of 101, in Farmington, Maine. Floyd moved back to Maine after his medical training to start a private practice in ophthalmology. An avid tinkerer, he helped develop the Floyd-Grant Irisophake, a device to stabilize a cataract during extraction. He also served as secretary of the Franklin Memorial Hospital Medical Society. Floyd is survived by his wife of 71 years, Emily; his children, Carl, David, Brian, and Penney; and several grandchildren.

## 1938

### Frank Lepreau, Jr.

Died on January 25, 2012, at the age of 99, at his home in Westport, Massachusetts. In 1948, Frank began a practice in general and thoracic surgery at the Truesdale Clinic and Hospital in Fall River, Massachusetts. He was a surgeon at the Hôpital Albert Schweitzer in Haiti from 1964 to 1973, and eventually became its medical director. Following his work in Haiti, Lepreau served with the Frontier Nursing Service in Hyden, Kentucky, before returning to Westport in the mid 1970s, where he remained until his death. He cofounded Stanley Street Treatment and Resources in Fall River, was medical director of the Rose Hawthorne Lathrop Home for Hospice Care, and taught at the Alpert Medical School at Brown University. Lepreau was predeceased by his wife of 54 years, Miriam (Monny); daughter, Sue; son, Jay; and granddaughter, Erica. He is survived by daughters Lucy Ann, Judy Keller,

and Mimi Jose; and several grandchildren and great-grandchildren.

## 1941

### Stanley Levenson

Died on March 28, 2012, at the age of 95, in San Francisco. Levenson's career focused on burn care and wound healing. Beginning in 1953, he served as chief of surgical metabolism at Walter Reed Army Institute of Research, in Washington, DC, and was associate clinical professor of surgery at Georgetown University School of Medicine. In 1961, he joined the faculty of Albert Einstein College of Medicine in New York as a professor of surgery, and eventually became University Professor Emeritus. He retired to San Francisco in 2002. Levenson was predeceased by his wife, Eleanor. He is survived by his daughters, Toby Sherwood and Laurie Mesibov; two grandsons; and three great-granddaughters.

## 1942

### Lawrence Hinkle, Jr.

Died on January 10, 2012, at the age of 93, at the Meadow Ridge retirement community in Redding, Connecticut. Hinkle served in the medical corps of the U.S. Naval Reserve during and following World War II. Hinkle was on staff at New York Hospital for more than 40 years. At his retirement in 1988, he was serving as professor of medicine, professor of medicine in psychiatry, and head of the Division of Human Ecology of the Department of Medicine at Cornell University Medical College, and as an attending physician at New York Hospital–University Medical

Center. Hinkle is survived by his wife of 70 years, Janice; children, Lawrence, Ward, Janice Gregory, Susan Murray, Catherine, and John; and 11 grandchildren.

## 1943

### Brantley Holt, Jr.

Died on January 9, 2012, at his home on Bainbridge Island, Washington. Brantley served in the U.S. Navy during World War II. He maintained a private surgical practice in Seattle until 1986, when he retired. Holt was predeceased by his first wife, Theodora; and his second wife, Anne. He is survived by his children, Brantley, Wolcott, and Hillary; his stepchildren, Corbet Clark, Lucy Snow, Trip Clark, Bruce Clark, and Tom Clark; 16 grandchildren; and 15 great-grandchildren.

### John Hubbell, Jr.

Died on January 6, 2012, at the age of 92, in Cambridge, Massachusetts. Hubbell served in the U.S. Naval Reserve, from 1945 to 1946 and from 1952 to 1954. He practiced general pediatrics at Longwood Pediatrics in Boston for 49 years, was an attending physician in the newborn nurseries at the Brigham and Women's Hospital, and served as an HMS assistant professor of pediatrics until his retirement in 2003. The Hubbell Teaching Service in the Department of Newborn Medicine at the Brigham was created in his honor. Hubbell is survived by his wife of 67 years, Martha; son, John; daughters, Pamela Robinson and Deborah Hudak; 9 grandchildren; and 15 great-grandchildren.

## 1944

### Wallace Bedell

Died on February 11, 2012, at his home in Charlottesville, Virginia. Bedell served in the U.S. Naval Reserve from 1941 to 1954, in Guam and in Bethesda, Maryland, where he worked on methods to grow human epithelial cells. He practiced surgery for 35 years at Vassar Brothers and St. Francis Hospitals in Poughkeepsie, New York. Bedell is survived by his wife, Dolores; daughter, Susanna; and two grandchildren.

### James Collett

Died on January 28, 2012, at the age of 91, at his home in Morganton, North Carolina. Collett served in the U.S. Army Medical Corps during World War II and in the U.S. Air Force during the Korean War. He maintained a private practice in internal medicine in his native Morganton for many years. Collett is survived by his wife, Nancy; his children, Jean VanNoppen, Ellen, James, Alexander, and William; and 12 grandchildren.

## 1946

### Robert Desautels

Died on February 21, 2012, at the age of 88. Desautels specialized in urology and general surgery, was an associate professor at HMS, and served on the staffs of Brigham and Women's and New England Deaconess Hospitals until 1994. He was predeceased by his wife, Dorothy. Desautels is survived by his children, Barbara Wilmott, Robert, Elizabeth Sundberg, and Marilynn Raineri;



# OBITUARIES

REMEMBERING DISTINGUISHED LIVES

his stepdaughter, Meg van Bael; eight grandchildren; and five great-grandchildren.

## Vincent Palladino

Died on March 10, 2012. Palladino retired as chairman of the Department of Pathology at Nassau County Medical Center, in East Meadow, New York. He was predeceased by his wife, Agnes; and is survived by his children, Vincent, Lora, and David; and four grandchildren.

## 1947

### James Johnston, III

Died on March 19, 2012. Johnston served in the U.S. Navy during World War II, and as an Army physician in the 1950s. He practiced general surgery in Sewickley, Pennsylvania, for 10 years, and then was on staff and chairman of the department of surgery at Carlisle Hospital in Carlisle, Pennsylvania, for more than 10 years. He was one of the founding partners of the Belvedere Medical Center surgical group, also in Carlisle. Johnston is survived by his wife of 62 years, Marion; children, Jennifer McKenna, Gail Viscome, Ann, David, and Lucy Johnston-Walsh; and 11 grandchildren.

### Howard Spiro

Died on March 11, 2012, in Branford, Connecticut. Spiro served in the U.S. Army from 1951 to 1953 as chief of gastroenterology at Madigan Army Hospital in Tacoma, Washington. He served as the founding section chief of gastroenterology in the Department of Internal Medicine at the Yale School of Medicine

from 1955 to 1982. He was director of the Yale Program for Humanities in Medicine from 1983 until his retirement in 1999. Spiro is survived by his wife of 61 years, Marian; four children, Pamela Wagner, Carolyn Silvestri, Philip, and Martha; and six grandchildren.

## 1948

### Paul O'Rourke

Died on January 28, 2012, at the age of 87, at his home in Aptos, California. O'Rourke earned a degree in public health at University of California Berkeley, and subsequently held several public health posts in California. He began his public health career as a county public health officer in El Centro, and later became state director of farm worker health services and the first director of the California Office of Economic Opportunity. O'Rourke is survived by his second wife, Marilyn, and their eight children.

### Maurice Pechet

Died on March 5, 2012, at the age of 94, at his home in Cambridge, Massachusetts. Pechet was an endocrinologist at Massachusetts General Hospital for more than 50 years. His research yielded new synthetic processes that contributed to the development of now-standard therapeutics, such as 5-fluorouracil, used in cancer treatment, and prednisone, used worldwide for many conditions. He is survived by his wife of 51 years, Kitty; and their children, Taine '92, Tamin, Tavan, and Tiron '90.

## 1949

### Leonard Robinson

Died on March 30, 2012, at the age of 88, in Boca Raton, Florida. Robinson is survived by his wife, Rose; and daughter, Phyllis.

### Harold "Tarp" Tarpley

Died on January 16, 2012, at the age of 86, in Ridgecrest, California. Tarpley served in the U.S. Air Force in Germany from 1950 to 1954. He later served in the U.S. Army stateside. He was a surgeon in Grand Forks, North Dakota, for more than 20 years. After earning board certification in psychiatry, Tarpley continued in practice in Fresno, California, for 25 years. He is survived by his children, Christopher, Daniel, Abigail Oliver, and Sarah Villarreal; 13 grandchildren; and 2 great-grandchildren.

## 1952

### John Shillito, Jr.

Died on March 16, 2012, at the age of 89, at Duke Hospice the Meadowlands, in Hillsborough, North Carolina. Shillito served in the U.S. Navy during World War II on the destroyer USS *Brush* in the Pacific. He joined the Department of Neurosurgery at what is now Boston Children's Hospital in 1958, and retired in 1995. Shillito is survived by his wife of 55 years, Bunny; and four children, Doug, Laurie, Will, and Betsy; and one granddaughter.

### Neil Thorlakson

Died on January 2, 2012, at the age of 85. Thorlakson served in the U.S. Navy for two years. He practiced ophthalmology

in Seattle, Washington, for 33 years, starting in his father's practice, and expanding into his own practice. He is survived by his wife of 61 years, Patsy; their children, Rob, Rich, Beth Campbell, and Lynn Kuske; eight grandchildren; and one great-grandson.

## 1954

### James Warbasse

Died on January 7, 2012, at the age of 84, in Baltimore, Maryland. Warbasse served as the chief of cardiology at the former U.S. Public Health Service Hospital in Wyman Park, Maryland, and later at St. Agnes Hospital in Baltimore. He was predeceased by his wife of 54 years, Elizabeth. He is survived by their children, Kristin, Wendy Horning, Bradford, and James; and five grandchildren.

## 1956

### Donald Muhich

Died on January 13, 2012, at the age of 80, at Saint Mary's Medical Center in Long Beach, California. Muhich maintained a private practice in psychiatry in California, and worked with several community mental health centers in California and Minnesota. An actor since high school, he appeared in several feature films as an adult, including *Bob & Carol & Ted & Alice* and *Blume in Love*. Muhich is survived by his former wife, Mary Louise; his son, Peter; his daughters, Anne and Jane; and one grandson.



## 1957

### **R. Gordon Hosford**

Died on March 4, 2012, at the age of 79, in Dallas, Texas, of throat cancer. Hosford served for two years in the U.S. Air Force as a flight surgeon. He was on staff at Baylor University Medical Center for 42 years, and served as medical director of the Visiting Nurse Association in Dallas. He was also a partner in a private internal medicine practice in Dallas. Hosford is survived by his second wife, Mary; his first wife, Suzanne; daughters, Sarah, Julia Barnes, and Lisa Jensen; son, Frederic; stepdaughters, Margie and Caroline; 11 grandchildren; and one great-grandchild.

## 1961

### **James Fischer**

Died on February 22, 2012, while running near his home in Madison, Connecticut. Fischer was a pioneer in developing nuclear magnetic resonance to study enzyme complexes, and conducted seminal research into the effects of radiation on tumors and normal tissue. These studies led to the development of radiation oncology techniques still in use today. He joined the faculty at Yale School of Medicine in 1968, and in 1972 was named the Robert E. Hunter Professor and chairman of the Department of Therapeutic Radiology. He retired as chair in 2002. Fischer is survived by his wife, Anne Curtis; his son, Henry, daughter, Gwendolyn Magnan; and four grandchildren.

## 1963

### **Richard Crews**

Died on March 7, 2012. Crews served in the U.S. Army as chief of psychiatry at Fort Bragg, North Carolina. He founded Columbia Pacific University in San Rafael, California. Crews is survived by his former wife, Joyce; son, Andrew, and stepdaughter, Bess.

## 1965

### **Stanley Baldwin**

Died on January 19, 2012, at the age of 72. Baldwin served as a general thoracic surgeon at the U.S. Air Force Medical Center in Ohio from 1971 to 1973. Following that service, he moved to Eugene, Oregon, where he joined a cardiology practice, and was also a cardiac surgeon at Sacred Heart Medical Center. Baldwin is survived by his wife, Judy; daughters, Heidi Raither, Heather Baldwin, and Wendy Ricketts; son, Robert; and eight grandchildren.

## 1966

### **Richard Knab**

Died on February 17, 2012, at the age of 71. Knab served in the U.S. Navy during the Vietnam War at the U.S. Naval Hospital at Camp Lejeune, North Carolina. He practiced general surgery at Brockton Hospital in Massachusetts, and served as chief of surgery and associate professor of surgery at Boston University School of Medicine. He later was on staff at the Dartmouth-Hitchcock Clinic in Manchester, New Hampshire, specializing in general surgery and gastroenterology. Knab is

survived by his wife of 20 years, Janet; children, Richard, John, Sarah Keitt, and Katherine; and six grandchildren.

## 1969

### **Roger Lange**

Died on January 19, 2012, at the age of 68, following a long illness. Lange was one of Boston's preeminent hematologist/oncologists. He had an appointment at the Brigham and Women's Hospital, and was an assistant clinical professor at HMS. He is survived by his wife, Lois; son, David; daughter, Nancy; and two granddaughters.

## 1970

### **James Tenney**

Died on March 12, 2012, of complications from Alzheimer's disease. Tenney was an epidemiologist at the University of Maryland Hospital and taught at the University of Maryland Medical School in Baltimore. He later worked at Bristol-Myers Squibb in Wallingford, Connecticut, and in the Yale Nursing Home Practice. Tenney is survived by his wife, Deborah; children, Michael, Elizabeth O'Neill, and Alison Luff; and two grandchildren.

## 1993

### **Albert Son Tu**

Died on January 15, 2012. Tu trained in radiology and interventional radiology, and practiced at Seacoast Radiology in Dover, New Hampshire. He is survived by his wife, Mai-Huong Tran; and children, David, Michael, and Michelle.

The obituaries in this issue of *Harvard Medicine* include alumni whose dates of death are from January 1, 2012, through March 31, 2012. Notices of alumni who have passed away April 1, 2012, and after can be found at <http://alumni.hms.harvard.edu/community/in-memoriam.html>. Beginning with the Winter 2013 issue of *Harvard Medicine*, full notices of alumni deaths will appear on the In Memoriam web page rather than in the print issue of this magazine.

If you know of an HMS alumna/us who has passed away recently, please send an email with the link to the obituary to [hmsalum@hms.harvard.edu](mailto:hmsalum@hms.harvard.edu).



# TAKING A HISTORY

PROFILE OF BRADFORD LUNDBORG



**ROAD FOLLOWED:** Custodian of a 600-acre coastal-forest nature preserve; blacksmithing instructor; an initial appointee to the California Coastal Commission; retired primary care physician, Santa Rosa, California.

**GOLDEN STATE:** Brad Lundborg '52 declared his career intentions while eating cracked crab on Fisherman's Wharf with his parents when he was very young. "I said, 'I'm going to be a psychiatrist,'" he recalls. "At that point, I didn't have a clue you had to go to medical school to become one." World War II put his plans on hold. Hewing to his pacifist roots, Lundborg served in the U.S. Merchant Marine. After graduating from Stanford University, he was accepted to HMS, where he discovered a new interest: rugby. This self-described "totally noncompetitive human being," eventually captained Harvard's Crimson team and played with the All-Star American Rugby squad that competed in Bermuda in 1952.

**RITZY BUSINESS:** At HMS, Lundborg worked as a research assistant for noted psychiatry professor Merrill Moore, a prolific poet whose patients hailed from the glamorous worlds of Broadway and Hollywood. "It was before the days of psychotropic drugs," he says. "Thorazine had just appeared in the research category and was used mainly for people with violent, acute psychiatric disorders." Recalls Lundborg, "Moore would analyze patients for three or four hours a day, and then we would monitor them for a few days in a suite at the Copley Plaza or Ritz Carlton." The work led Lundborg to reconsider that decision made in San Francisco.

**MEDICAL MAVERICK:** He decided on primary care, ultimately establishing a private practice in Santa Rosa. In Sonoma County in the early 1960s, he recalls, health insurance wasn't common; patients often paid out of pocket. Then came the insurance companies, followed by Medicare and Medicaid. Costs rose. Lundborg responded by joining a nonprofit HMO, Health Plan of the Redwoods, which provided health care to 78,000 residents in a four-county area. Lundborg retired in 1997, after serving as the HMO's medical director for ten years. Since beginning his practice in 1958, he had fostered the health of three generations in the region.

**A NEW LEAF:** Lundborg's caregiving hasn't been restricted to humans. In the 1970s, with 3,200 acres of forest rescued from a housing developer, he helped establish Annadel State Park. In the early 1970s, he inherited the 600-acre Palmer Creek Ranch and set about restoring the heavily logged land. His goal: regrow the forest and re-establish its wildlife. He's also teaching blacksmithing to young people, an activity, he says, that fills him with joy. He has inadvertently become part of a simple-living lifestyle that he says is trending out West. "If the pendulum can swing, and it must swing, people need to be there to welcome it," he says.

—M.R.F. Buckley

JEAN HEGLAND





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